ATTO Technology, Inc.

ATTO FastStream SC 5300

Installation and Operation Manual

Fibre Channel to SCSI Storage Appliance

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1.0 ATTO FastStream SC 5300 offers data protection

The ATTO FastStream SC 5300 is an ideal solution for the cost sensitive demands of today's networked storage environments, offering great performance, OS independence, simplified management, and RAID protection for all of your critical data.

Adding RAID ensures your data is protected without compromising performance. The ATTO FastStream SC 5300 is a high performance RAID storage appliance which can be seamlessly integrated into an existing storage environment without regard to any particular manufacturer, type of drive, capacity or speed.

The ATTO FastStream SC 5300 is ideally suited for data intensive applications such as digital video and audio editing. ATTO Audio Latency Management™ technology provides parity RAID protection while managing latency to allow high-speed availability to support multiple tracks of audio editing.

While RAID improves data accessibility and reliability during normal operations, you still need a good backup strategy for long-term protection of your data.

The ATTO FastStream SC 5300 is available in an industry standard rack mount 1U enclosure.

FastStream features

- 2 independent 4-Gigabit Fibre Channel Host Interfaces to integrate existing direct attached storage into a high performance SAN environment
- 2 Ultra320 SCSI device high speed connections backward compatible with Ultra160 devices
- Industry standard rack mount enclosure
- The ATTO ExpressNAV™ browser-based GUI simplifies configuration, management and navigation.
- Capable of measuring performance during normal operation and during the drive initialization process
- Phone Home error notification automatically generates an E-mail alert in the event of a failure
- Field updateable firmware with the ability to save configuration settings for easy field replacement
- RoHS compliant

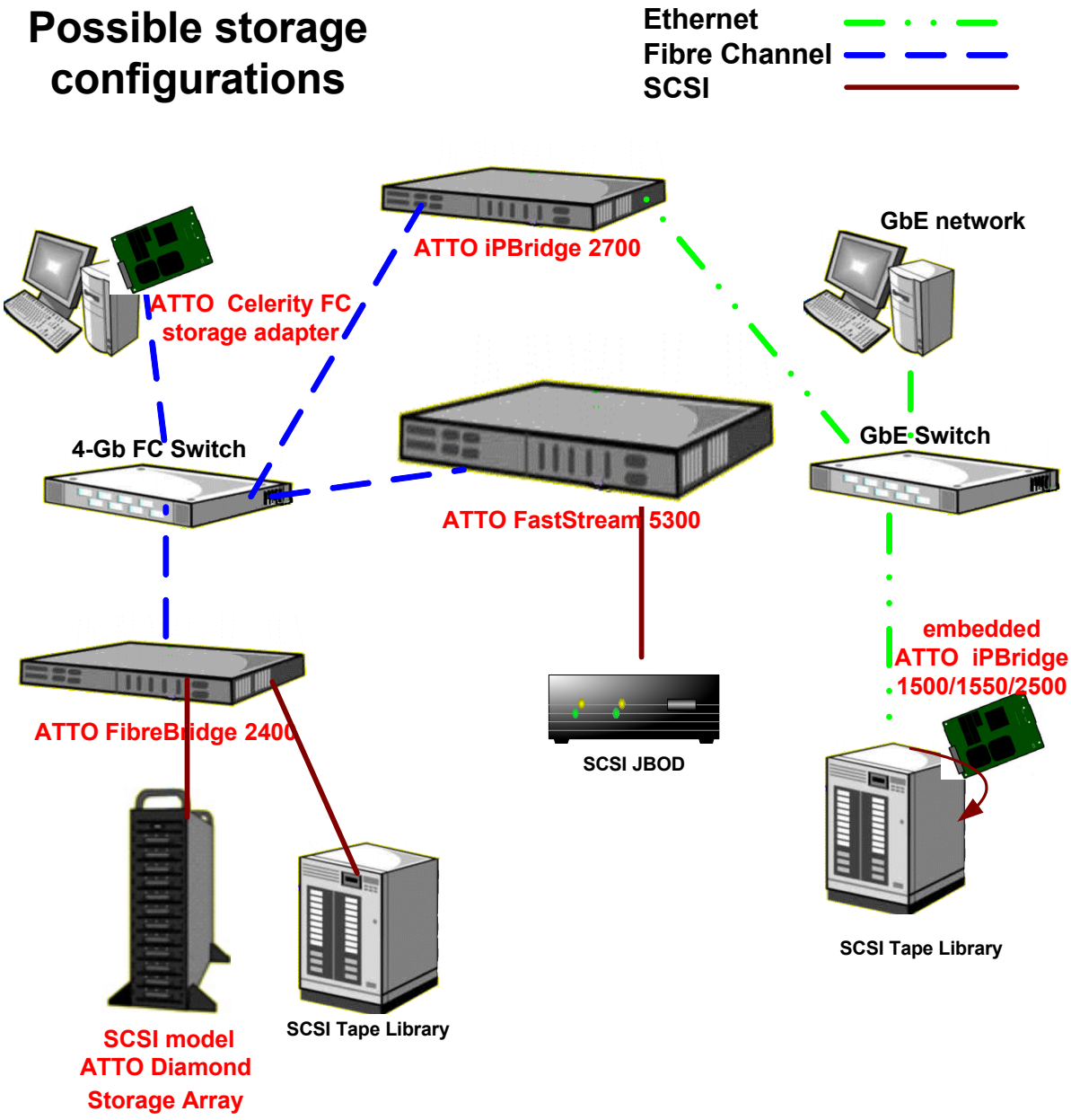
RAID protection features

- Hardware DVRAID, RAID Level 0, RAID Level 1, RAID Level 5, RAID Level 10 and JBOD, all user configurable
- N-way mirroring
- Global Hot Spares to ensure continuous operation if a drive fails. The Hot Spare automatically comes on-line and rebuild starts if a disk failure is detected
- Automatic rebuild of RAID groups and changeable Rebuild Priority keep the system operational if a drive fails

Audio/video features

- DVRAID provides 11 streams of SD video, dual streams of HD video of HD video with an Alpha channel title
- Supports up to 192 tracks of 16-bit audio or 96 tracks of 24-bit audio in a single editing session
- Support for video on demand
- Support for multiple streams of audio

Possible storage configurations



1.1 Physical attributes

The ATTO FastStream SC 5300 is a Fibre Channel to SCSI storage appliance which can be seamlessly integrated into an existing storage environment.

The ATTO FastStream SC 5300 is available in an industry-standard 1U form factor for easy integration into racks. It supports next-generation media and, as a result, is equipped to handle the throughputs needed by advanced disk technologies.

Dimensions

Width: 17 inches
Length: 8.94 inches
Height: 1.7 inches (1U)
Weight: approximately 8 pounds

Cooling and airflow

Operating Temperature: 0°-40° C external
Humidity: 10-90% non-condensing
Airflow: air enters through slots on the right of the rear panel and exits through slots on the left of the rear panel.

CAUTION

Do not block the enclosure's vents. The FastStream SC 5300 does not allow data transfer if overheating occurs.

Power

The power supply circuit is permanently mounted within the enclosure and is not hot-swappable. It has one standard IEC320 power receptacle and switch.

CAUTION

The power source must be connected to a protective earth ground and comply with local electrical codes. Improper grounding may result in an electrical shock or damage to the unit.

Input voltage: 10/230V AC, with operating input range of 90-132V AC or 175-264V AC, 47-63Hz, single phase. The AC input range selection is automatic with no manual or jumper switchover required.
Power draw: 2 amps at 110V, 1.6 amps @ 90V

Fibre Channel port

Two independent 4-Gigabit Fibre Channel ports connect the FastStream SC 5300 to either a Fabric or Arbitrated Loop using Small Formfactor Pluggable (SFP) interfaces. Keep cable lengths as short as possible to ensure the highest signal quality and performance. For details, refer to Cabling on page i of the Appendix.

SCSI ports

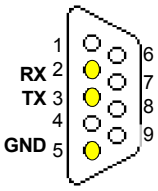
The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.
The ports are Ultra 320 SCSI busses with VHDCI connector, downward compatible with all forms of Single-ended Differential SCSI and all previous SCSI protocols.

Ethernet port

The 10/100 base T Ethernet port is accessible from the RJ45 connector and supports local diagnostics.

Serial port

The RS-232 serial port provides support for remote monitoring and management using a DB9 connector. The baud rate is programmable and preset at the factory to 115200 bps.



Reset/restore factory default switch

To reset the FastStream, briefly insert a tool in the hole in the back panel.

To restore factory defaults, insert the tool in the hole in the back panel for more than four seconds until the green Ready LED blinks.

LED indicators

The LED indicators can be viewed from the connector side and the front side of the FastStream SC 5300. (See Exhibit 1.1-1)

LEDs on the connector side are:

A bicolor Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.

Embedded in the Ethernet port connector: a lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.

Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.

SCSI ports: A green LED on each port indicates activity if is lit.

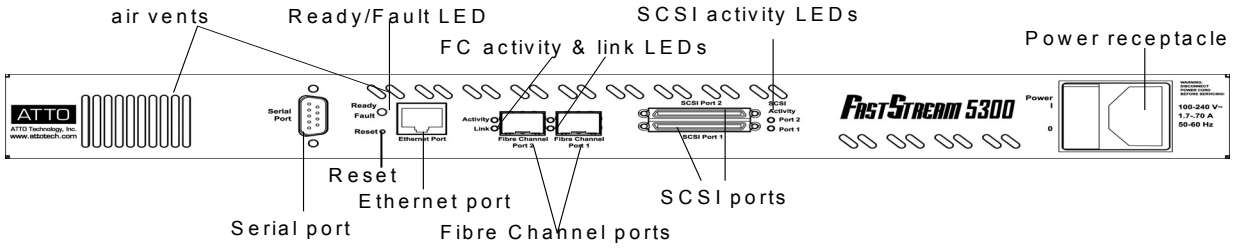
LEDs on the faceplate are:

A bicolor Ready/Fault LED is lighted green to indicate ready, lighted yellow to show a faulted condition, and off indicates not ready.

SCSI ports: A green LED on each port indicates activity if is lit.

Fibre Channel port: bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Exhibit 1.1-1 Connectors, LEDs and power receptacle



2.0 Installation

If you have not already completed the instructions on the Quick Start page packed with your FastStream SC 5300, use the following instructions to install the FastStream SC 5300.

Unpack the packing box; verify contents

- The FastStream. Note the serial number of your FastStream unit: _____
- Power cord
- “L” brackets for mounting in a 19” rack
- Ethernet cable
- RS 232 cable
- CD which includes the Firmware, Installation and Operation Manual, QuickNAV™ IP discovery program and system drivers

Install the FastStream

1 Place the FastStream SC 5300 on a stable flat surface or install it into a standard rack.

If installing into a rack, see Exhibit 2.0-1.

a. Attach “L” brackets so that the front side with the LEDs face front and the connector side is at the back.

b. Install the FastStream horizontally within the rack so it does not reduce the air flow within the rack.

2 Connect and power up Fibre Channel devices from your SAN to the FastStream using SFPs and multimode fiber optic cables for the Fibre Channel ports. Keep cable lengths as short as possible to ensure the highest signal quality and performance. See Exhibit 2.0-2 on page 6 and refer to Cabling on page i of the Appendix.

3 Connect and power up SCSI target devices.See Exhibit 2.0-2 on page 6 and refer to Cabling on page i of the Appendix.

4 Connect the Ethernet port to your network.

5 Connect the AC power cord from the FastStream to the proper AC source outlet.

CAUTION

The power source must be connected to a protective earth ground and comply with local electrical codes. Improper grounding may result in an electrical shock or damage to the unit.

If you are using a rack:

a. Properly ground the FastStream to the rack equipment. The earth ground connection must be maintained.

b. The power requirements plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.

6 Turn on power to the FastStream using the power switch.

7 Wait up to two minutes for the FastStream Ready LED to light indicating the FastStream has completed its power-on self test sequence.

Discover the IP address

Note

The FastStream SC 5300 is initially configured with DHCP enabled. It is best if you have access to a DHCP server.

1 Work from the computer attached to the FastStream SC 5300 Ethernet port on the same broadcast domain. From the CD supplied with your FastStream, run the QuickNav Utility **QuickNAV-windows.exe** for Windows or **QuickNAV-Mac** for Mac OS X.

2 Locate the FastStream with the serial number recorded earlier.

3 Highlight the serial number.

4 Click **Next**.

If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address:

_____

If you do not have a DHCP server, get an IP address and subnet mask from your network administrator, type it into the area provided, and click on **Next**.

5 Click on **Launch Browser**

Your browser points to the ATTO ExpressNAV splash screen. If you use Internet Explorer as a browser, continue on to Internet Explorer setup below. If not, continue on to Begin initial configuration .

Internet Explorer setup

1 Open your browser
2 Select **Internet Options**.
3 In the **Internet Options** screen, select the **Security** tab.
4 Click on the **Trusted Sites** icon.
5 Click on the **Sites** button.
6 In the text box **Add this Web site to the zone**, add the IP address of the appliance. You may use wild cards.
7 Click on **Add**
8 Uncheck the **Require server verification** check box.
9 Click **OK.**
10 At the bottom of the **Internet Options** box, click on **OK** and close the box.

Begin initial configuration

1 The ExpressNAV interface welcome screen appears. Click on **Enter Here**
2 Type in the user name and password.

Note

*The default values are user name **root** and password **Password**. The user name is case insensitive and the password is case sensitive.It is best practice to change the default user name and password. Refer to* *Change current user name, password on page 15.*

Exhibit 2.0-1 Brackets to install the FastStream SC 5300 into a rack.

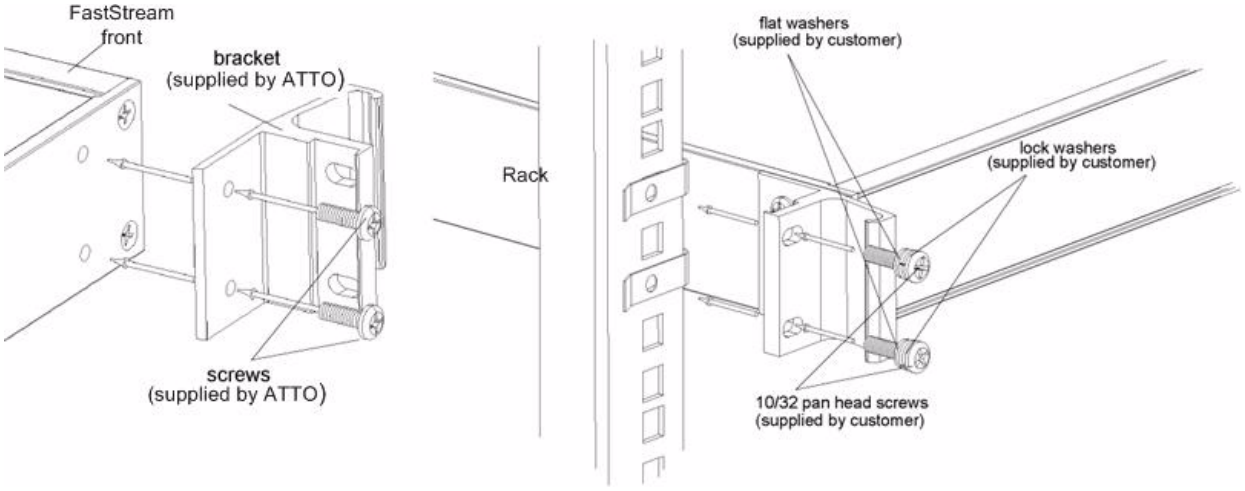
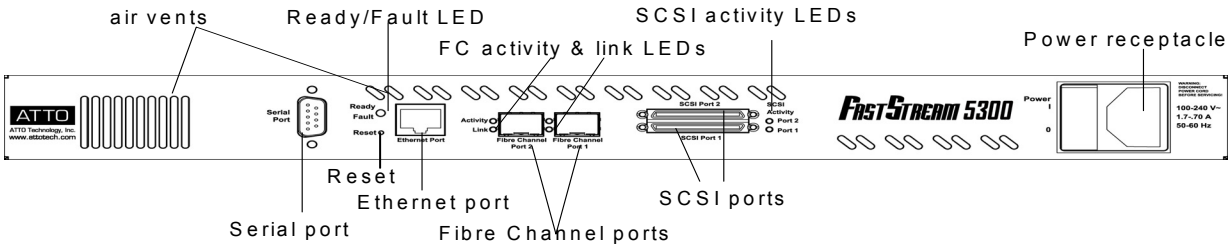


Exhibit 2.0-2 Connectors, LEDs and power receptacle



2.1 Configure RAID

The ATTO FastStream SC 5300 allows configuration of storage into DVRAID, JBOD, RAID Level 0, RAID Level 1, RAID Level 10 or RAID Level 5, all with partitions.

RAID is a storage configuration which uses multiple drives to increase capacity, performance and/or reliability. The FastStream SC 5300 can set up an application-ready RAID configuration automatically, or you may custom design a RAID configuration.

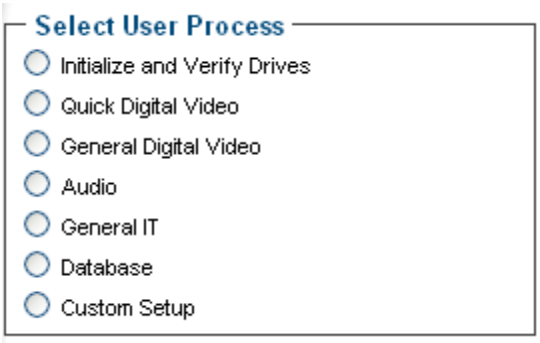
The FastStream SC 5300 uses all available drives when you select **Quick Digital Video, General Digital Video, Audio, General IT** or **Database**. Available drives include those which are on-line and not currently configured for RAID. If you wish to have another type of RAID configuration in the same system, you should ensure the drives you want in that configuration are offline, then follow the instructions in Modify storage on page 21.

Before creating any RAID group you should initialize and verify the drives you want in the RAID group.

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before setting up RAID groups.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.



Initialize and verify drives

Before creating any RAID group you should initialize and verify your drives to ensure drive integrity. When selected, the FastStream SC 5300 writes a pattern to the entire drive.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

During initialization and verification, the FastStream SC 5300 collects performance measurements. Performance data is available once initialization begins. You may view it from the **Drive Performance and Health** page accessible from the **Diagnostics** menu. This performance data is lost when the appliance is powered off.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. Select **Initialize and Verify Drives**.
3. Click **Next.**
4. Select **Initialize and Verify**

   All eligible drives are highlighted in green; the system only initializes highlighted drives.
5. Click **Commit**.

   The drive(s) selected are now initialized and verified. All data on the highlight drives has been erased and you may continue with the initial automatic setup.

Select an application

When you select an application, the FastStream SC 5300 finds all available drives and creates the appropriate setup using those drives. The most flexible choice is to use **Custom Setup**, but you must understand your needs and your system well to use this option.

Refer to Designing RAID groups on page iii of the Appendix for more information about RAID.

Choose one of the following setups

- **Quick Digital Video**: provides parity RAID protection (DVRAID) and optimized performance for digital video (sequential access) configurations using 6, 12 or 24 drives. This set up does not allow you to use any number but 6, 12 or 24 drives. DVRAID provides 11 streams of SD video, dual streams of HD video of HD video with an Alpha channel title.

Note

DVRAID is only available using the Quick Digital Video setup wizard.

- **General Digital Video**: provides parity RAID protection for digital applications for configurations using three or more drives.
- **Audio**: ATS™ (Audio Track Streaming) technology provides parity RAID protection while managing latency to allow high-speed availability to support up to 192 tracks of 16-bit audio or 96 tracks of 24-bit audio in a single editing session using three or more drives.
- **General IT**: provides parity RAID protection optimized for random access applications using three or more drives.
- **Database:** provides parity RAID protection for database applications (small transfer, random access) for configurations using more than three drives.

General Digital Video, General IT or Database

1 If you have chosen **General Digital Video, General IT** or **Database**, the **Setup Wizard** page appears.
If all your drives do not appear in the **Find Drives** box, click on **System Scan**.
2 Click on **Commit**.
3 A warning box appears.
If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.
If you wish to start over, click **No**.The **Setup Wizard** page appears.

Quick Digital Video

1 If you have chosen **Quick Digital Video,** the **Setup Wizard** page appears.
Select your operating system.
2 Click on **Next.**

Note

Depending on your choice and your current system, the appliance may need to restart.

3 If all your drives do not appear in the **Find Drives** box, click on **System Scan**.
4 Click **Next.**
5 Click either **Standard Fault Tolerance** (no Hot Spare drives) or **Maximum Fault Tolerance** (which would add Hot Spares to the system). Refer to Use Hot Spares on page 13 for details.
6 Click **Commit**.
7 A warning box appears.
If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.
If you wish to start over, click **No**.The **Setup Wizard** page appears.

Audio

1 If you have chosen **Audio,** the **Audio Setup Wizard** page appears.
Choose to use the same or a different node name for each Fibre Channel port.
- If you are sure you want or do not want all drives to be available to all Fibre Channel ports, select **Yes** or **No**. If you do not know, select **Not Sure.**
- If you select **Not Sure**, several more questions are presented. Answers to these questions may produce more questions; if you change an answer, different questions may be asked. Make your choices based on your needs and system.
- Several definitions are listed in a grey box at the bottom of the **Audio Setup Wizard** screen which may help you determine answers to the setup questions.

2 Click on **Next.**

Note

Depending on your choice and your current system, the appliance may need to restart.

3 If all your drives do not appear in the **Find Drives** box, click on **System Scan**.

4 Click **Commit**.

5 A warning box appears.

If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

If you wish to start over, click **No**.The **Setup Wizard** page appears.

Custom initial setup

If the application setups do not suit your needs, you may use **Custom Setup** to configure the FastStream SC 5300.

1 If you have chosen the **Custom Setup button, the RAID Setup Wizard** page appears.

2 Click on **Next**.

3 Select a RAID level. Refer to Designing RAID groups on page iii of the Appendix

4 Type a name for your RAID group in the box provided on the page under the **Step 2** heading.

5 Click **Next.**

6 Note the setup you have chosen. If you want to change the Interleave level, click on the drop down box.

CAUTION

Changing the default interleave size may degrade performance.

7 Click on the **System Scan** button to discover the drives available for RAID configuration.

8 When the scanned drives box is populated, click on the boxes representing the drives for the RAID group named in Step 4.

9 Click **Next**.

10 Partition the RAID group as defined in Partition RAID groups on page 11. Partitioning allows you to divide a single RAID group into multiple independent partitions. If you don't want to use Partitions, click on the **All Unallocated** button.

11 Click **Create.** The partitioning you have chosen appears.

12 Click **Next**.

13 **Step 6** asks you to verify the setup. If the setup is correct, click on **Commit**.

14 A warning box appears.

If you want to continue click **Yes.** The configuration completes and the **RAID Setup** page appears allowing you to continue making RAID groups or to end the session.

If you do not want the setup, click **No** and the **RAID Setup Wizard** page appears.

2.2 Partition RAID groups

A RAID group may have several Terabytes of total data capacity because of the size of the included drives. Partitions allow you to break up large RAID groups into smaller, more manageable groups without using individual lower capacity RAID groups.

Most host systems can only address 2 TB per LUN. Partitioning increases storage efficiency by providing more LUNs without using lower capacity RAID groups. Partitioning allows the creation of multiple logical volumes. Use the FastStream SC 5300 ExpressNAV interface and follow its directions to divide the default one partition into subpartitions.

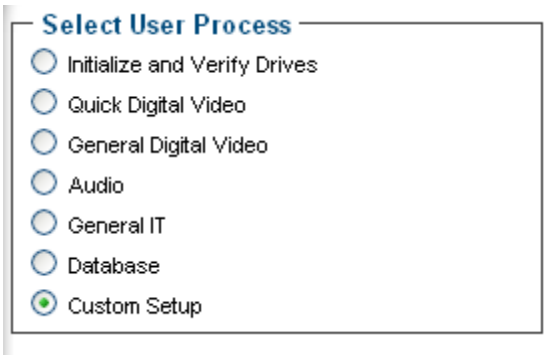
Setting up partitions

When you initially create RAID groups or add RAID groups, you may partition large RAID volumes into smaller, more manageable sizes.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 Click on the **Manage** button.

Click the **RAID Groups** arrow

3 Click the **Create RAID Groups** button
4 Click **Next**



5 Choose **Custom Setup**.
6 Type in the RAID protection level you would like
7 Type in a name for the RAID group
8 Click **Next**
9 Choose an interleave size from the drop-down menu.

CAUTION

Changing the default interleave size may degrade performance.

10 Choose the drives which you want to add to this RAID group
11 Click **Next**
12 If you want to regulate the partition size, type in the partition size (in Gigabyte, Megabyte or blocks) and click **Create**

If you do not wish to choose a partition size, or you want to include the rest of your storage in this partition, choose the **All Unallocated** button.

13 Click **Next**
14 The **Setup Verification** page appears. If you agree with the partition information presented, click **Commit**
15 A warning box appears. If you wish to continue with the partitioning, click on **Yes**. The configuration completes and the **Health and Status Monitor** page appears.

If you wish to change or cancel partitioning, click on **No**. the **Partition Page** appears.

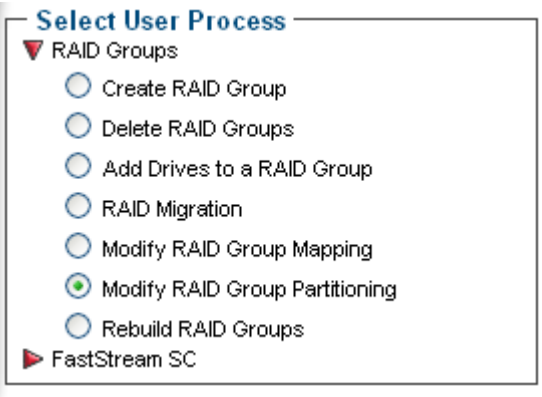
Modifying partitions

CAUTION

Modifying partitions causes loss of existing data.

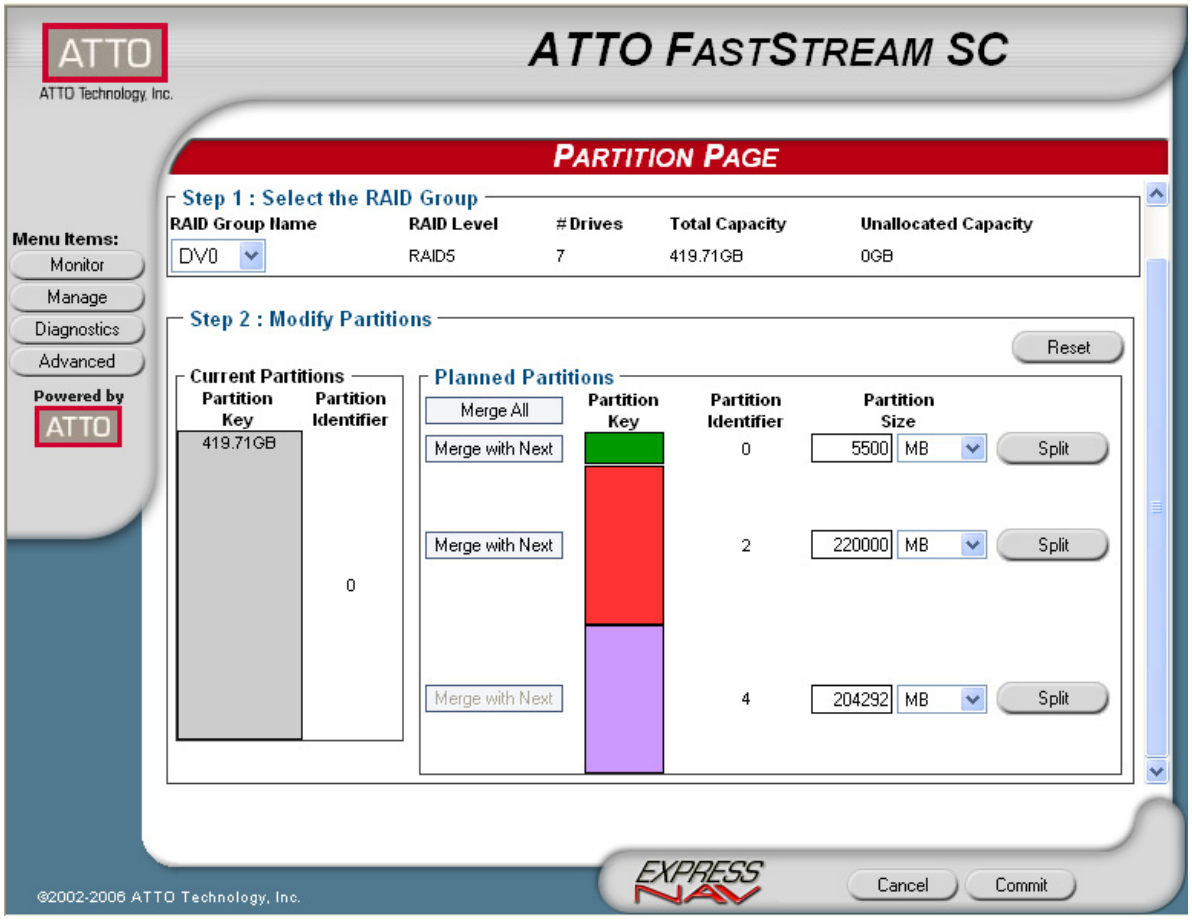
1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 Click on the **Manage** button.

3 Click on the **RAID Groups** arrow



4 Click on the **Modify RAID Group Partitioning** button
5 Click **Next**
6 Select the **RAID Group Name** from the drop down menu
7 Choose to either merge or split existing partitions or assign different values for the partition sizes.
8 Click **Commit**
9 A warning box appears. If you wish to continue with the partitioning, click on **Yes**. The configuration completes and the **Health and Status Monitor** page appears.
If you wish to change or cancel partitioning, click on **No**. the **Partition Page** appears.

*Exhibit 2.2-1 The **Partition Page** wizard takes you through the partitioning process.*



2.3 Use Hot Spares

If a member of a virtual device becomes degraded or faulted, you lose some redundancy in your RAID group until a new member is rebuilt into the RAID group. However, Hot Spare devices may be designated as replacements for faulted devices without intervention by you or a host.

The ATTO FastStream SC 5300 replaces degraded or faulted virtual devices in RAID groups without intervention by you or a host. You may set up a pool of Hot Spare devices of different sizes appropriate for your RAID groups or Hot Spare devices may be set up automatically depending on your initial configuration.

Note

Block devices in the Hot Spare pool should be of appropriate size to the RAID group so that smaller block devices are not replaced by much larger Hot Spare devices.

When the ATTO FastStream SC 5300 detects a faulted device:

- The Controller searches the Hot Spare pool for the smallest block device of sufficient size to substitute for the faulted drive.
- The FastStream replaces the faulted device with the device from the Hot Spare pool.
- The FastStream begins an automatic rebuild of the RAID groups.

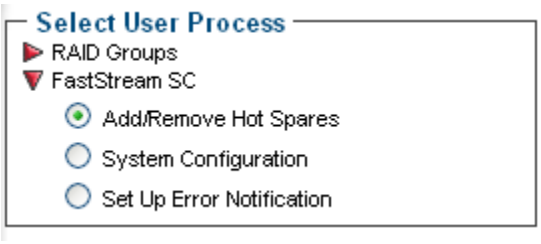
Note

A RAID rebuild may take up to two hours to complete.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 Click on the **FastStream** arrow.

3 Click on the **Add/Remove Hot Spares** button



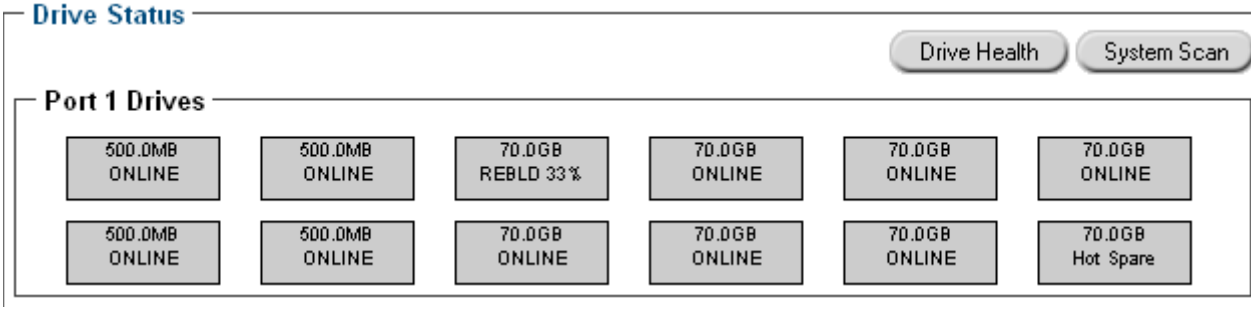
4 Click on **Next**.

5 The **Add/Remove Hot Spares** page appears. Follow the on-screen directions. When you complete your changes, click on **Commit**.

6 A warning box appears.

If you wish to continue, click on **Yes**. The configuration completes and the **Health and Status Monitor** page appears.
If you do not wish to add or remove Hot Spares, click on **No**. The **Add/Remove Hot Spares** page appears.

Exhibit 2.3-1 Various screens throughout the ExpressNAV interface show you the status of drives, including Hot Spare designations.



2.4 Optional changes to system setup

Default values are appropriate for most configurations, but may be modified for your needs using ATTO FastStream SC 5300 browser-based user interface.

It is best practice to change the default user name and password to a user name and password significant to you. Other configurations may also be changed, however, use extreme caution when changing default values.

Change current user name, password

It is best practice to change the user name and password.

1 Open a Command Line Interface session either using Telnet or the serial port as shown in Interface options on page 27.
2 Type **set username [user name]**
3 Press **Enter.**
4 Type **set Password**
5 Press **Enter**
6 Follow the instructions on the screen to confirm your old and new password.

Note

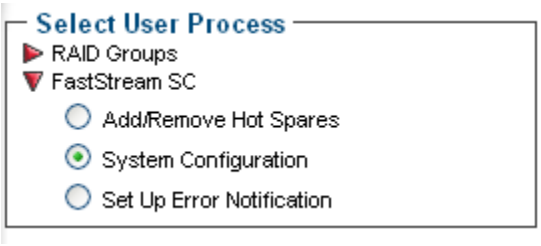
The user name is case insensitive and password is case sensitive.

The user name and password for all Telnet, FTP and ATTO FastStream SC 5300 browser-based user interface sessions is changed.

Change system configurations

You may change whether the system uses the Simple Network Time Protocol or a manually set time; the data rate, connection mode and hard address value of each Fibre Channel port, and the bus speed and Initiator ID of each SCSI port.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 Click on the **Manage** button.
3 Click on **Next.**
4 Click on the **FastStream** arrow.



5 Click on the **System Configuration** button
6 Click on **Next**.
7 When you have completed your changes, click on **Commit**.

Advanced CLI page

Changes to other parameters may be made using the **Advanced** page.

CAUTION

Do not use this page unless you are directed to by an ATTO technician. Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

Note

The ExpressNAV interface is the preferred method to manage the FastStream SC 5300.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 In the left-hand menu, click on the **Advanced** menu item.
3 The **Advanced CLI Configuration** page appears. Wait for the **Ready** prompt, then type in the CLI command in the text box provided. Refer to CLI provides an ASCII-based interface on page v of the Appendix..
4 Click the **Submit** button: this is equivalent to typing in the CLI command into a telnet or serial port CLI session.

A text field beneath the box lists the most recent commands issued to the FastStream through this page. If you enter an incorrect parameter, the CLI help text is displayed, showing the parameters available. An asterisk next to the **Ready** prompt indicates you must type **SaveConfiguration restart** in the text box for changes to take effect.

3.0 Monitor storage, configurations

You may determine the performance of drives attached to the FastStream SC 5300 using various displays and tests in ExpressNAV interface.

The following instructions assume you have already set up at least one RAID group. Refer to Configure RAID on page 7.

The ATTO FastStream SC 5300 collects various metrics to measure performance for physical drives attached to the FastStream during normal system operation and drive initialization and verification.

CAUTION

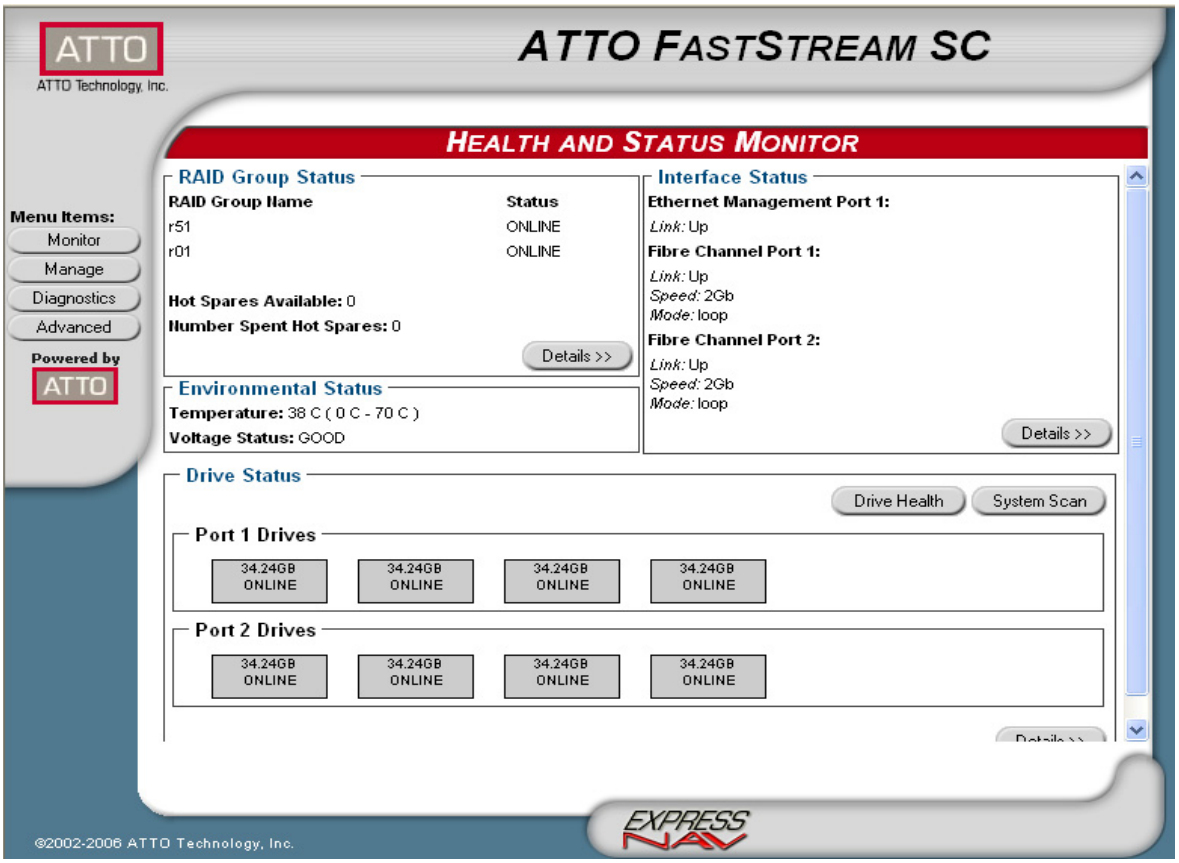
New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the ExpressNAV interface completely whenever you need maximum performance.

Health and Status Monitor page

The **Health and Status Monitor** page is the first page you see when you open the ExpressNAV interface after completing the configuration of at least one RAID group. You may return to it at any time by clicking on the **Monitor** button on the left hand side of the screen.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 The **Health and Status Monitor** page appears. If you click **Details,** added information about each parameter appears on the **Configuration**



Display page (refer to Configuration Display page below).

- **RAID Group Status**
  RAID Group names, RAID status, available Hot Spares and number of faulted drives
- **Environmental Status**
  Temperature and voltage
- **Interface Status**
  Ethernet management port link status and Fibre Channel port link, speed and connection mode
- **Drive status by port**
  Size and status of each drive on each port

Configuration Display page

Clicking on **Details** in the **Health and Status Monitor** page gives you added information about each parameter on the **Configuration Display** page. You may view the details of any parameter from this page.

- RAID groups
  RAID group names, RAID status, available Hot Spares, number of faulted drives, RAID Level, Interleave and total capacity of each RAID group.
- Drives
  Drive configuration by port, including drive size and status
- Interfaces
  Ethernet management port link status and Fibre Channel port link, speed, connection mode, Node Name and Port Name.

Note

*At any point, if you do not want to continue before you click **Commit,** click on the **Cancel** button to return to the previous setup menu.*

Phone home: E-mail messages provide error notification

E-mail notification allows the FastStream SC 5300 to send an E-mail message to you, a network administrator or other users when certain events occur with the FastStream. Serious error messages are sent immediately, while messages for less serious errors are sent every 15 minutes.

- Types of errors
  - Device errors such as medium error, aborted command and hard error
  - Device transitions from online to offline
  - Critical and warning temperature conditions
  - Critical and warning voltage conditions
  - Power recycle/power failure conditions
- Warning messages
  - device down
  - medium error
  - abort command
- Warning levels
  - **All**: warnings, critical events and informational messages are sent
  - **Critical:** critical event E-mails are sent
  - **Warning:** warnings and critical event E-mails are sent
  - **None**: no E-mails are sent

You may send E-mails to up to five E-mail addresses and designate which conditions prompt each E-mail notification.

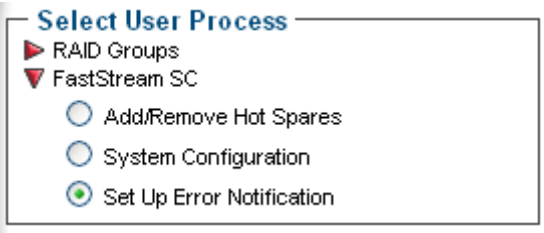
For example, a recipient with a critical severity level only receives critical messages and not warning or informational messages.

When an event occurs that warrants E-mail notification, the FastStream SC 5300 sends the message; it cannot respond to a rejection by a server for an invalid address. Ensure all E-mail addresses typed in are valid.

Each E-mail is time stamped when it leaves as part of the SMTP header information as shown in Exhibit 3.0-1.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 The **Health and Status Monitor** page appears. On the menu at the left hand side of the page, choose **Manage**.

3 The **Manage Menu** page appears. Click on the **FastStream** arrow.



4 Click the **Set up Error Notification** button
5 Click **Next.**
6 Click on the **Enabled** button for **Notification Configuration**
7 Type in the sender address (E-mails show this name in the **From** field)
8 Type in the SMTP Server IP Address
9 Type in the user name and password of your SMTP E-mail account
10 Type in up to five E-mail addresses
11 Choose **All**, **Critical** or **Warning** for each E-mail address.
12 When all information is typed in, click **Commit**.
13 Your settings are displayed. You may change or disable E-mail notification at any time from the **Error Notification** page.

Exhibit 3.0-1 The E-mail messages sent by the FastStream SC 5300 follow this format.

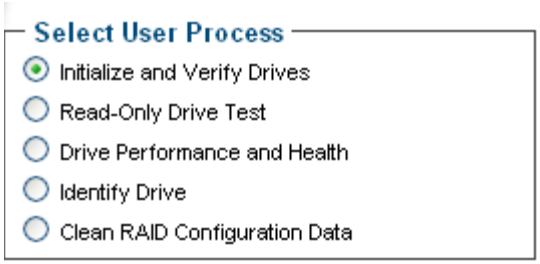
```
Subject: [The Type of Event that Occurred]

Message Body:

This is a status message from [FastStream name]. Identifying information as well
as the most recent entries from the event log appear below.
*************** Unit Information  ***************
Serial Number : [Serial Number]
IP Addresses:  [IP Address1]
               [IP Address2]
***************  Event Log Entries  ****************
[Listing of the ten latest event log entries]
```

Identify drive issues

New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the browser ExpressNAV interface completely whenever you need maximum performance.

Preliminary steps

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 The **Health and Status Monitor** page appears.Click the **Diagnostics** button on the left hand menu.
3 Select the operation you wish to perform from the next menu presented.



Verify storage

CAUTION

Data may be erased during this process. Back up your data before selecting Commit.

You may verify the status of storage which does not belong to a RAID group (unattached storage) to identify drive issues after drives have been initialized.

If the verify operation detects an error, the FastStream tries to re-initialize the drive, erasing information stored on the drive. Be sure to back up data before performing verification.

1 Follow the instructions in Preliminary steps on page 20.
2 Click the **Initialize and Verify** button
3 Click **Next**
4 If no drives appear in the information box, click on the **System Scan** button.
If drives are available, click on the drives you wish to test; the drives are highlighted. Drives which belong to RAID groups cannot be selected.
5 Select **Verify Only**
6 Click **Commit**
7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

Scan drive surfaces: read only drive test

The read only test performs a non-destructive scan over the entire surface of each drive to identify bad areas of the disk drives and determine read performance. It may be run while data is passing through the FastStream.

Running this test may negatively impact performance. Once the Read-only test has completed, system operation returns to normal.

1 Follow the instructions in Preliminary steps on page 20.
2 Click the **Read-Only Drive Test** button
3 Click **Next**
4 If no drives appear in the information box, click on the **System Scan** button.
If drives are available, click on the drives you wish to test; the drives are highlighted.
5 Click **Commit**
6 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

Measure drive performance

During the testing process, the **Drive Performance and Health** screen appears.click on **Show Help Text and Drives** for an alternative view of the test progress.

During the tests the **Time Remaining** box tells you how much time remains until the verification process is complete. The representation of each drive in the **Drives** box shows the percentage of verification completed.

When the test is complete, click on each drive to see its information highlighted in the **Drive Metrics** window.

If you close the browser or navigate away from this page, you may re-access these results by clicking the **Diagnostics** button and choosing the **Drive Performance and Health** option. Results are available until the FastStream is restarted.

1 Follow the instructions in Preliminary steps on page 20.
2 Click on **Drive Performance and Health**.
3 Click **Next.**
4 The **Drive Performance and Health** page appears. Click on a drive in the drive section.
5 Click **Start**.
Drive performance is displayed under the **Drive Metrics** section of the **Drive Performance and Health** page. Drive errors are displayed in the **Drive Errors** section of the page.

Identify a drive attached to the FastStream

CAUTION

Executing this command will adversely impact performance and throughput for the time that the LED is illuminated.

1 Follow the instructions in Preliminary steps on page 20.
2 Click on **Identify Drive**.
3 The **Identify Drive** page appears. Click on any drive. Only one drive may be selected at a time.
4 Click **Commit**. The I/O LED of the drive illuminates for one minute.
5 To stop the operation, unselect the drive.

Note

To clean RAID configuration data, refer to Update RAID configuration data on page 26

4.0 Modify storage

Use the ExpressNAV interface to replace a failed drive, add new drives or new RAID configurations.

You may modify various aspects of storage using the **Manage Menu** found by clicking on the tab on the left hand side of the ExpressNAV interface. Be cautious when deleting storage or rearranging storage configurations because data could be compromised or lost.

Initialize and verify drives

When you initially set up the FastStream, replace a failed drive or add new drives to the FastStream, perform drive initialization and verification to these drives.

When these drives are selected, the FastStream writes a pattern to the entire drive. This operation attempts to fix soft errors and reallocate bad blocks on existing drives.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. Select **Initialize and Verify Drives**
3. Click **Next**
4. Select **Initialize and Verify**
5. All eligible drives are highlighted in green; the system only initializes highlighted drives. Ensure only the drives you are initializing are selected. Click **Commit**

CAUTION

Do not restart the FastStream or disconnect or power cycle drives during Drive Initialization and Verification or you must start the verification process from the beginning.

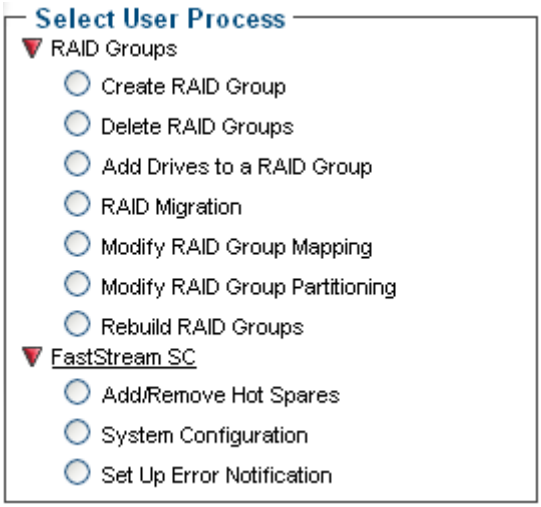
Preliminary steps

Begin with these steps, then choose the process you wish to enable.

Note

An unallocated drive or unallocated storage is storage which is not part of a RAID group, not designated as a Hot Spare or was offline when you initially set up a RAID configuration using the ExpressNAV interface.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. The **Health and Status Monitor** page appears.
3. Click on the **Manage** button on the left hand side of the ExpressNAV interface.
4. Select the operation you wish to perform from the **Manage Menu**.

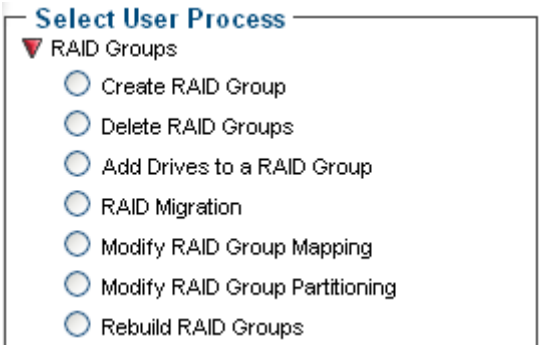


RAID group processes

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Ensure all data is backed up.

Follow the instructions in Preliminary steps on page 21, then choose which process you wish to enable.



Create a new RAID group

The FastStream SC 5300 uses all available drives when you select **Quick Digital Video, General Digital Video, Audio, General IT** or **Database** applications. To have several types of RAID configurations within your system, ensure the drives for the alternative configurations are offline.

1. Ensure the drives you are using for the new RAID group are initialized following the instructions in Initialize and verify drives on page 21.
2. Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
3. Click on the **Create RAID Group** button.
4. Click on **Next**.
5. Choose a particular application or **Custom Setup** and follow the directions as found in Configure RAID on page 7.

Delete RAID groups

1. Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
2. Click on **Delete RAID Groups**
3. Click on **Next**
4. Click on each RAID group you want to delete
5. Click the **Delete** button
6. When you have selected all the groups you wish to delete, click **Commit**.
7. A warning box appears.

   If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

   If you wish to start over, click **No**.The **Setup Wizard** page appears.

Add drives to an existing RAID group

Add unallocated storage to an existing RAID group.

1. Ensure the drives you are using are initialized following the instructions in Initialize and verify drives on page 21
2. Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
3. Click on **Add Drives to an Existing RAID Group**
4. Click on **Next**
5. Select the RAID group you wish to add the drives to from the drop down menu.
6. Click on the drives you wish to add to your RAID group
7. When you have completed your changes, click on **Commit**
8. A warning box appears.

   If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

   If you wish to start over, click **No**.The **Setup Wizard** page appears.

Change RAID configuration: migration

If you have unallocated drives, you can use them to change the parity protection of an existing RAID group. The following migration levels are supported:

- JBOD to RAID Level 0
- JBOD to RAID Level 1

- RAID Level 0 to RAID Level 10
- RAID Level 1 to RAID 10
- N-way mirroring: add additional redundancy to RAID Level 1

CAUTION

Do not restart the FastStream or disconnect or power cycle drives during RAID migration. Data could be compromised or lost.

1 Ensure the drives you are using are initialized following the instructions in Initialize and verify drives on page 21
2 Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
3 Click on the **RAID Migration** button.
4 Click on **Next**.
5 Follow the on-screen directions. When you have made your changes, click on **Commit**.
6 A warning box appears.

If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

If you wish to start over, click **No**.The **Setup Wizard** page appears.

Modify RAID group mapping

You may change the way a RAID group's LUNs are mapped to each port.

1 Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
2 Click on the **Modify RAID Group Mapping** button.
3 Click on **Next**.
4 Follow the on-screen directions. When you have made your changes, click on **Commit**.
5 A warning box appears.

If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

If you wish to start over, click **No**.The **Setup Wizard** page appears.

Modify RAID group partitions

For an explanation of partitions, refer to Partition RAID groups on page 11.

1 Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
2 Click on the **Modify RAID Group Partitioning** button.
3 Click on **Next**.
4 Follow the on-screen directions. When you have made your changes, click on **Commit**.
5 A warning box appears.

If you want to continue click **Yes.** The configuration completes and the **Health and Status Monitor** page appears.

If you wish to start over, click **No**.The **Setup Wizard** page appears.

Rebuild RAID groups

If RAID groups become compromised in some fashion, you must rebuild groups.

Note

A RAID rebuild may take up to two hours to complete.

1 Follow the instructions in Preliminary steps on page 21 and click on the **Manage** menu item on the left side of the page and then the **RAID Groups** arrow.
2 Click on the **Rebuild RAID groups** button.
3 Click on **Next**.
4 Follow the on-screen directions.

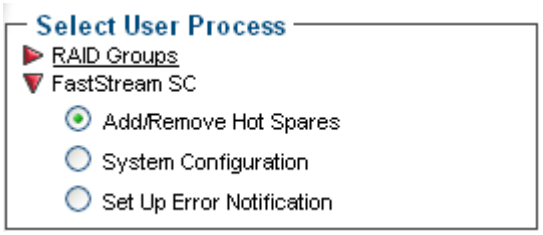
FastStream process: add or remove Hot Spares

For an explanation of Hot Spares, refer to Use Hot Spares on page 13.

1 Follow the instructions in Preliminary steps on page 21.

2 The **Manage** menu appears. Select the **FastStream** drop down arrow.

3 Select the **Add/Remove Hot Spares** button.



4 Click **Next**

5 Select the drive(s) you want to add or remove from the Hot Spare pool by clicking on the boxes representing those drives.

6 When you have completed your changes, click **Commit**.

7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete, the **Health and Status Monitor** screen appears

Note

*For **System Configuration** and **Set Up Error Notification**, refer to Optional changes to system configurations on page 15 and Phone home: E-mail messages provide error notification on page 18*

Update RAID configuration data

If you move single drives between devices without erasing the drives, you may want to clean stale RAID configuration data from the drives, permanently removing the drive from the RAID group. Drives must belong to a RAID group now or have once belonged to a RAID group and are labeled **Replaced** after system scans.

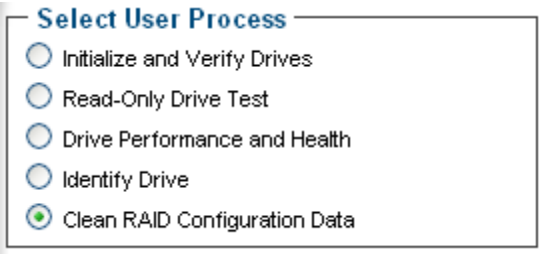
CAUTION

Continue with extreme caution: data is lost on the drive when it is cleaned of RAID information.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 Click the **Diagnostics** button on the **Menu Items** list on the left hand side of the ExpressNAV interface.

3 Click in the **Clean RAID Configuration data** radio button.



4 Click **Next**

5 Click on the drives you wish to update; the drives are highlighted.

6 Click on **Commit**

7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete, the **Health and Status Monitor** screen appears

Note

To clean Hot Spare information from a drive, use FastStream process: add or remove Hot Spares on page 23.

5.0 Update firmware, configurations

*You can update the ATTO FastStream SC 5300 at any time. Refer to **www.attotech.com** for complete information.*

Several methods are available to update the ATTO FastStream firmware and to re-initialize attached storage. Be sure all data is backed up before using any of these procedures to prevent data loss.

Update firmware

The ATTO FastStream SC 5300 has several processors which control the flow of data. The firmware to control these processors can be upgraded in the field using the PUT command from an FTP connection or the zModem utility over an RS-232 serial connection.

Preliminary steps

1 The ATTO FastStream SC 5300 firmware is distributed as a compressed .zip file. Uncompress the **.zip** file into an image file (**.ima**). Note the filename. The **.zip** file can be uncompressed using any utility that supports the **zip** format.

CAUTION

Ensure that all I/O to the ATTO FastStream SC 5300 has stopped.

During this procedure*, do not* interrupt the flash process. Do not power down the host or the ATTO FastStream SC 5300 until the display returns the Ready prompt. Interrupting the flash process makes your ATTO FastStream SC 5300 inoperable and you must return it to ATTO for repair.

2 Decide whether to use FTP over Ethernet or a terminal program using the RS-232 serial link, and continue with one of the following procedures.

Use FTP over Ethernet

1 Establish an FTP link to the ATTO FastStream SC 5300 that is to be flashed.

2 Use the **PUT** command to download the firmware. For example

```
PUT c:\firmware\FB5300100.IMA
```

3 Once the download is complete, cycle power on the ATTO FastStream SC 5300 to implement the new firmware.

Use the RS-232 serial link

1 Load a Terminal Program such as Hyper Terminal.

2 Set the terminal and the ATTO FastStream SC 5300 for the highest possible baud rate for your terminal.

3 Turn on power to the ATTO FastStream SC 5300.

4 Once the Ready prompt appears, type **ZMODEM RECEIVE.** The ATTO FastStream SC 5300 displays that it is preparing to receive a file from your terminal program.

5 On the terminal program, choose **Transfer Send File**

6 In the **Send File** box, type in the current ATTO FastStream SC 5300 **.ima** file or click the browse button to find it

7 Click **Send File**

8 The ATTO FastStream SC 5300 should acknowledge receiving the file and display a message not to interrupt power for 90 seconds.

9 Once the download is complete, cycle power on the ATTO FastStream SC 5300 to invoke the new firmware.

Initialize storage

Initializing unattached storage may be used to remove stale RAID configuration data from a drive that is known to be in good health.

This operation erases all information stored on your drive; back up data before selecting **Commit**.

CAUTION

Data is erased during this process. Back up your data before clicking on Commit. These operations have a negative impact on the performance of normal operations; all activity should be stopped.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

1 Click the **Diagnostics** button

2 Click the **Initialize and Verify** button or the **Initialize Only** button.

3 Click **Next**

4 Click on the drives you wish to test; the drives are highlighted.

5 Select **Initialize and Verify**

6 Click **Commit**

7 A warning message displays; choose **yes** to continue.

8 The **Drive Performance and Health** screen appears

9 The **Time Remaining** box tells you how much time remains until the process is complete. The representation of each drive in the **Drives** box shows the percentage completed.

Update RAID configuration data

If you move single drives between devices without erasing the drives, you may want to clean stale RAID configuration data from the drives, permanently removing the drive from the RAID group. Drives must belong to a RAID group now or have once belonged to a RAID group and are labeled **Replaced** after system scans.

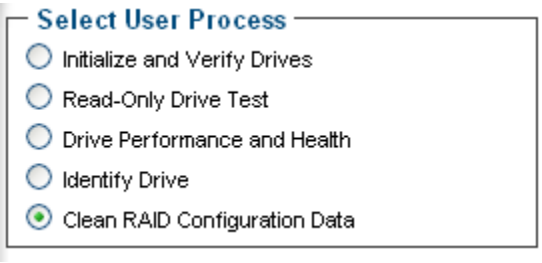
CAUTION

Continue with extreme caution: data is lost on the drive when it is cleaned of RAID information.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 Click the **Diagnostics** button on the **Menu Items** list on the left hand side of the ExpressNAV interface.

3 Click in the **Clean RAID Configuration data** radio button.



4 Click **Next**

5 Click on the drives you wish to update; the drives are highlighted.

6 Click on **Commit**

7 A warning box appears. In the warning box, verify that you want to complete the configuration by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete, the **Health and Status Monitor** screen appears

Note

*To clean Hot Spare information from a drive, use the **Add/Delete Hot Spares** from the **Menu Items** list on the left hand side of the ExpressNAV interface. Refer to FastStream process: add or remove Hot Spares on page 23.*

6.0 Interface options

The best way to manage, monitor and configure the FastStream SC 5300 is to use the ExpressNAV interface, a browser-based application included with your FastStream, but you may use a terminal emulation program or Telnet.

Use the ExpressNAV interface

Use the ExpressNAV interface, a browser-based GUI, to manage, monitor and configure the unit. The choices you make lead you from screen to screen. Choices which are not available are greyed out.

1 Working from the computer attached to the FastStream SC 5300 Ethernet port, open your browser and type in the FastStream SC 5300 IP address as noted in Discover the IP address on page 5.

2 Your browser points to the FastStream SC 5300 splash screen. Press **Enter.**

3 Type in the user name and password values.

Note

*The default values are user name: **root** and password: **Password**. The user name is case insensitive and the password is case sensitive. It is best practice to change the user name and password. Refer to Change current user name, password on page 15.*

The pages which next appear depend on whether or not you have begun configuring the FastStream SC 5300. Refer to Configure RAID on page 7.

Use the serial port

To connect to a terminal emulation program or Telnet to manage the FastStream SC 5300, use the serial port.

1 Connect a cable from FastStream SC 5300 RS-232 serial port or header to the serial (COM) port on a personal computer.

2 Turn on the FastStream SC 5300.

3 Start a terminal emulation program on the personal computer, and use it to connect to the FastStream SC 5300. For example, if you are using Hyper Terminal on a computer running a Windows operating system,

a. Type **FastStream SC 5300** in the **New Connection** dialog box.

b. Click **OK**.

c. In the **Connect To** dialog box in the **Connect using field,** select the COM port number to which your serial cable is connected.

d. Click **OK**.

e. In the COM Properties dialog box select the following values:

- Bits per second: 115200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: None
- Terminal type: ASCII
- Echo: on

f. Click **OK.**

4 After you connect to the FastStream SC 5300, start-up messages are displayed. The last line in the start-up message sequence is **Ready**.

Make adjustments to the FastStream SC 5300 using the Command Line Interface as described in CLI provides an ASCII-based interface on page v of the Appendix.

Note

*In serial port sessions, there is no prompt on the line below the word **Ready**. Begin typing commands in the blank line where the cursor is resting. No user name or password is required for serial port access.*

5 To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Enter.**

If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved.

If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters in length.

Use Telnet

Up to three Telnet sessions can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first “set” CLI command can continue to issue set commands, while the other sessions can only issue “get” commands or display information. Once a connection is established, refer to CLI provides an ASCII-based interface on page v of the Appendix.

1 Connect to the FastStream SC 5300 from a computer on the same Ethernet network.

2 Start a Telnet session.

Note

There is more than one way to connect to the FastStream SC 5300 using a telnet program. Your telnet program may operate differently than in the following instructions.

3 At the telnet prompt, issue the **open** command where x.x.x.x is the IP address of the FastStream SC 5300.

```
telnet > open x.x.x.x
```

4 If you have to specify a port type, type in the port type “telnet” and the terminal type “vt100”.

```
port type: telnet
terminal type: vt100
```

5 Type in the default values for the user name, **root**, and the password, **Password**, if you did not set new values in Change current user name, password on page 15.

Appendix A Cabling

Additional information to physically connect ports to devices and to your SAN.

SCSI cabling

Cables and devices must be chosen to maximize performance and minimize the electrical noise from the high-speed data transfers available with the SCSI protocol. Cabling and termination methods become important considerations for proper performance. SCSI cables and devices are subject to specific length and number limitations to deal with electrical problems that arise at increased operating speeds.

Cable types

Use high-quality cables rated for the type of SCSI transfers required: well-insulated SCSI cables ensure error free communications. Try to keep cable lengths as short as possible to ensure higher signal quality and performance.

Note

UltraSCSI is very sensitive to SCSI bus noise, cable distances and the number of devices connected on the SCSI bus. Carefully connect your devices when working with UltraSCSI.

Exhibit A-1 Various types of SCSI operate at different speeds and require different bus lengths to support a certain number of devices.

STA terms	Bus speed MB/sec. max.	Bus width bits	Max. bus lengths in meters			Max. device support
			Single-ended	Differential	LVD	
Fast SCSI	10	8	3	25	NA	8
Fast/WIDE SCSI	20	16	3	25	NA	16
UltraSCSI	20	8	1.5	25	NA	8
Ultra/WIDE SCSI	40	16	NA	25	NA	16
Ultra/WIDE SCSI	40	16	1.5	NA	NA	8
Ultra/WIDE SCSI	40	16	3	NA	NA	4
Ultra2 SCSI	80	16	NA	NA	12	8
Ultra2/WIDE SCSI	80	16	NA	NA	12	16
Ultra160/WIDE SCSI	160	16	NA	NA	12	16
Ultra320 SCSI	320	16	NA	NA	12	16

Connecting SCSI devices to SCSI ports

SCSI ports connect SCSI storage devices to the network. Each SCSI port is totally independent from the other SCSI port.

Each SCSI port is a bus capable of supporting 15 devices and each bus is capable of 40, 80 or 160 MB/sec. (Ultra, Ultra2 or Ultra160) transfer rates.

Each SCSI bus auto-negotiates the appropriate sync rates with the connected devices. If slower devices are mixed with faster devices, the bus communicates at the rate of the slowest device, thus wasting the performance capabilities of the faster devices. Connect slower devices to one SCSI port and connect faster devices to the other port.

The FastStream SC 5300 supports a wide variety of SCSI storage devices including stand-alone drives, removable drives, JBODs, RAIDs, tape, CD and DVD drives, changers and libraries.

1 Connect the cable from the SCSI device to a VHDCI SCSI port on the FastStream SC 5300.

2 Check the type of cable, cable length limit and number of devices recommended for the port. See Exhibit A-1.

   Keep cable lengths as short as possible to ensure the highest signal quality and performance. These cable lengths include the wiring inside the devices.

3 Set the IDs of the SCSI devices connected to the FastStream SC 5300 to a value other than 7.

   Use a sequential ID starting at 0 for each device. The SCSI port has an internal factory setting ID of 7, typical for a SCSI initiator device.

4 Terminate the SCSI bus after the last device. The FastStream SC 5300 is terminated internally.

Fibre Channel connections

The Fibre Channel port connects the FastStream SC 5300 into either a Fabric or Arbitrated Loop.

The FastStream SC 5300 uses optical SFP connectors and multimode fiber optic cable.

Make sure all cables are anchored securely at both ends with the proper connectors. Use the shortest possible cable length for best performance.

Cable length	Cable size
Up to 175 meters	62.5 micron
Up to 500 meters	50 micron

Appendix B Designing RAID groups

The ATTO FastStream SC 5300 provides instant hardware data protection and intelligence to existing Fibre Channel storage independent of the storage type.

CAUTION

Selecting RAID configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before setting up RAID groups.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

The ATTO FastStream SC 5300 allows RAID functionality. In general, the process begins with individual drives also called block devices.

Note

If a drive has corrupt or outdated configuration data, that drive cannot be assigned to any RAID group. Ensure all drives to be assigned to RAID groups are configured properly. Refer to Initialize and verify drives on page 19 and Update RAID configuration data on page 26.

A RAID group is a virtual, independent single drive whose data is written to physical drives according to a RAID algorithm. The ATTO FastStream SC 5300 supports JBOD, RAID Level 0, RAID Level 1, RAID Level 10, DVRAID and RAID Level 5.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

JBOD (Just a Bunch of Disks)

JBOD (Just a Bunch of Disks) configuration allows many individual drives to be available for normal storage operations with no special data protection.

Using the ATTO FastStream SC 5300 allows you to concatenate several individual drives into one large drive.

A JBOD drive can be constructed as a special case of a RAID group. When multiple physical drives are assigned to a JBOD RAID group, their storage areas appear as a single spanned area of storage. The ATTO FastStream SC 5300 supports 1 to 32 drives per JBOD-configured RAID group.

Exhibit A-2 JBOD: Just a Bunch of Disks: no redundancy; each disk is treated independently

JBOD

Disk 0	Disk 1	Disk 2
D0	D4	D8
D1	D5	D9
D2	D6	D10
D3	D7	D11

DVRAID (Digital Video RAID)

Digital Video RAID provides parity redundancy for your data. Optimized for performance for the high data transfer rates required in digital video environments, DVRAID is ATTO Technology proprietary technology which supports the editing of uncompressed 10-bit High Definition (HD) video and multiple streams of real-time, uncompressed Stand Definition (SD) video.

You must use the Quick Digital Video setup wizard in the ExpressNAV interface for 6, 12 or 24 drives. This set up does not allow you to use any number but 6, 12 or 24 drives.

RAID Level 0

RAID Level 0 (striping) is based on the fact that increased performance can be achieved by simultaneously accessing data across multiple drives, increasing data transfer rates while reducing average access time by overlapping drive seeks. RAID Level 0 groups provide data that is striped across several drives. Drives are accessed alternately, as if stacked one on top of the other.

RAID Level 0 provides no data protection. If one If one drive fails, all data within that stripe set is lost.

The ATTO FastStream SC 5300 supports 2 to 16 drives per RAID Level 0 group.

RAID Level 0 is used by applications requiring high performance for non-critical data.

Exhibit A-3 RAID Level 0, no redundancy

RAID Level 0

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	D5
1	D6	D7	D8	D9	D10	D11
2	D12	D13	D14	D15	D16	D17
3	D18	D19	D20	D21	D22	D23

RAID Level 1

RAID Level 1 ensures the security of data by writing the exact same data simultaneously to two or more different drives. This application is for users with critical data which cannot be lost or corrupted due to the failure of a single drive.

With RAID Level 1, the host sees what it believes to be a single physical drive of a specific size: it does not know about the mirrored pair.

The ATTO FastStream SC 5300 manages where data is written and read, allowing one drive to fail without the host knowing it has failed. RAID Level 1 is used in applications containing mission critical data. The ATTO FastStream SC 5300 supports an even number of 2 to 16 drives per RAID Level 1 group.

Exhibit A-4 RAID Level 1: Data is written to two or more drives simultaneously.

RAID Level 1

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D4	D4	D8	D8
1	D1	D1	D5	D5	D9	D9
2	D2	D2	D6	D6	D10	D10
3	D3	D3	D7	D7	D11	D11

RAID Level 10

RAID Level 10 increases data transfer rates while ensuring security by writing the exact same data simultaneously to two or more different drives. RAID Level 10 is used in applications requiring high performance and redundancy, combining the attributes of RAID Levels 1 and 0.

The ATTO FastStream SC 5300 supports an even number of 4 to 16 drives per RAID Level 10 group.

Exhibit A-5 RAID Level 10 with mirroring and spanning; redundancy is shown in shaded blocks.

RAID Level 10

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D1	D1	D2	D2
1	D3	D3	D4	D4	D5	D5
2	D6	D6	D7	D7	D8	D8
3	D9	D9	D10	D10	D11	D11

RAID Level 5

RAID Level 5 increases reliability while using fewer drives than mirroring by employing parity redundancy. Distributed parity on multiple drives allows you to rebuild a failed drive from the remaining good drives. The ATTO FastStream SC 5300 operates in degraded mode if a drive fails.

The ATTO FastStream SC 5300 supports 3 to 16 drives per RAID Level 5 group.

Exhibit A-6 RAID Level 5 with parity blocks shaded.

RAID Level 5

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	P0-4
1	D6	D7	D8	D9	P5-9	D5
2	D12	D13	D14	P10-14	D10	D11
3	D18	D19	P15-19	D15	D16	D17
4	D24	P20-24	D20	D21	D22	D23
5	P25-29	D25	D26	D27	D28	D29

Appendix C CLI provides an ASCII-based interface

The command line interface (CLI) uses ASCII commands typed while in CLI mode.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.
Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.
The ExpressNAV interface is the preferred method to operate and manage the FastStream SC 5300. Refer to Interface options on page 27 for details.

The command line interface (CLI) is a set of ASCII-based commands which perform configuration and diagnostic tasks. Refer to Interface options on page 27.

- CLI commands are context sensitive and generally follow a standard format

```
[Get|Set] Command [Parameter1|Parameter2]
```

  followed by the **return** or **enter** key
- CLI commands are case insensitive: you may type all upper or all lower case or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.
- Commands generally have three types of operation: get, set and immediate.
- The get form returns the value of a parameter or setting and is an informational command.
- Responses to get commands are followed by **Ready**.
- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.
- Responses to **set** commands are either an error message or **Ready. *.** The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command.
- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.

Note

Using certain CLI commands during normal operation can cause a performance drop. Once command actions are complete, performance should return to normal levels.

Exhibit A-7 Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual.

Symbol	Indicates
[ ]	Required entry
< >	Optional entry
|	pick one of
\n	end of line
-	a range (6 – 9 = 6, 7, 8, 9)
Boldface words	must be typed as they appear
Italicized words	Arguments which must be replaced by whatever they represent
fl	Fibre Channel lun number (0 <= fl <= 31)
fp	Fibre Channel port number (0<= fp <= 2)
mp1	Ethernet port used to manage the FastStream SC 5300
BlockDevID	index designation of a block device not assigned to any other RAID group
DevIndex	index designation of the RAID member
GroupName	the name of the RAID group to which the block device is assigned, or blank if the block device is available
MemberIndex	index designation of a RAID group member

CLI error messages

The following error messages may be returned by the Command line Interface

```
ERROR. Invalid Command. Type 'Help' for command list.
ERROR. Wrong/Missing Parameters
Usage: <usage string>
ERROR Invalid RAID Group state
ERROR Invalid Block Device index
ERROR Invalid RAID Member index
ERROR Maximum number of RAID Groups exceeded
ERROR Insufficient number of RAID Group members
ERROR
Block Device at specified index no longer available
ERROR Insufficient RAID Group members for RAID type
```

CLI summary

The following chart summarizes the Command Line Interface commands, their defaults, and an example of how to enter the commands.

Commands which have no default values have a blank entry in that column of the table.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.
Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.
The ExpressNAV interface is the preferred method to operate and manage the FastStream SC 5300. Refer to Interface options on page 27 for details.

Command	Default	Example
AutoMap		automap
AutoResume	rebuild =enabled erase=disabled write pattern= disabled	set autoresume all disabled
BlockDevClean		blockdevclean 30
BlockDevIdentify		blockdevidentify 30
BlockDevIDStop		blockdevidstop
BlockDevScan		blockdevscan
BootFibreDelay	0	set bootfibredelay 15
BridgeModel		get bridgemodel
BridgeName	“ “	set bridgename Omega6
ClearEventLog		cleareventlog
Date		set date 03/03/2003
DefaultInterleave	128	set defaultinterleave 64
DeleteAllMaps		deleteallmaps
DHCPFixedDelay	0	set dhcpfixeddelay 15
DisplayEventLog		displayeventlog
DisplayEventLogFilter	all all all	set displayeventlogfilter gen info all
DriveTest		drivetest begin
DriveTestConfig		set drivetestconfig read

Command	Default	Example
DriveTestList		drivetestlist all
DriveTestStatus		get driveteststatus
DumpConfiguration		dumpconfiguration
DumpEventLog		dumpeventlog
EmailFromAddress		set emailfromaddress notify1@attotech.com
EmailNotify	disabled	set emailnotify enabled
EmailNotifyAddress		get emailnotifyaddress
EmailPassword		set emailpassword alpha123
EmailServerAddress	0.0.0.0	get emailserveraddress
EmailUsername		get emailusername
EthernetMDIX	MDI	ethernetmdix
EthernetSpeed	auto	set ethernetspeed 100
EventLog	enabled	set eventlog disabled
EventLogFilter	all all all	set eventlogfilter gen info all
Exit		exit
FCConnMode	loop	set fcconnmode ptp
FCDataRate	auto	get fcdatarate
FCHard	disabled	set fchard enabled
FCHardAddress	fp1=3; fp2=4	set fchardaddress 1 122
FCMultiNode	disabled	set fcmultinode enabled
FCPortErrors		get fcporterrors all
FCPortFailover	disabled	set fcportfailover enabled
FCPortList		fcportlist
FCPortRecover		fcportrecover
FCSCSIBusyStatus	busy	get fcscsibusystatus
FCWWName		get fcwwname 1
FirmwareRestart		firmwarerestart
Help		help driveinfo
HSAdd		hsadd 3
HSDisplay		hsdisplay
HSRemove		hsremove 3
IdentifyBridge	disabled	set identifyBridge enabled
Info		info
IPAddress		get ipaddress mp1
IPDHCP	enabled	set ipdhcp mp1 disabled
IPGateway		get ipgateway mp1
IPSubnetMask		get ipsubnetmask mp1
IsReserved		isreserved
MaxOpTemp	70	get maxoptemp
Metrics		metrics display all
MinOpTemp	0	set minoptemp 10
OpTempWarn	5	set optempwarn 15
Partition		partition alpha1 6 4 GB
PartitionDisplay		partitiondisplay alpha1
PartitionMerge		partitionmerge all

Command	Default	Example
PartitionSplit		partitionsplit alpha1 22 2
Password	Password	set password
Performance		get performance 2
Ping		ping mp1 192.42.155.155
RAIDCommandTimeout	30000	raidcommandtimeout 10000
RAIDRebuildPriority	same	set raidrebuildpriority low
Reserve		reserve
ResetFCPortErrors		resetfcporterrors 1
RestoreConfiguration		restoreconfiguration default
RGAddStorage		rgaddstorage g1 span commit
RGCancelAddStorage		rgcanceladdstorage g1
RGCommit		rgcommit all
RGCreate		rgcreate g1 raid0
RGDelete		rgdelete g1
RGDisplay		rgdisplay all
RGErase		rgerase g1
RGHaltConversion		rghaltconversion g1
RGHaltErase		rghalterase g1
RGHaltRebuild		rghaltrebuild g1
RGHaltWritePattern		rghaltwritepattern g1
RGMemberAdd		rgmemberadd g1 22
RGMemberRemove		rgmemberremove g1 22
RGRebuild		rgrebuild g1
RGResumeConversion		rgresumeconversion g1
RGResumeErase		rgresumeerase g1
RGResumeRebuild		rgresumerebuild g1
RGResumeWritePattern		rgresumewritepattern g1
RGSpanDepth	1	set rgspandepth g1 22
RGSpeedRead	disabled	set rgspeedread g1 enabled
RGUnmap		rgunmap g1
RGWaitTimeout	5	rgwaittimeout 30
RGWritePattern		rgwritepattern g1 pattern
RMState		set rmstate g1 online
RMStatus		rmstatus g1
Route		route fc 1 0 raid alpha1 6
RouteDisplay		routedisplay fc
SaveConfiguration		saveconfiguration restart
SCSIDomainValidation		scsidomainvalidation
SCSIInitId	0x07	set scsiinitid 2 12
SCSIPortBusSpeed	ultra320	set scsiportbusspeed 2 ultra160
SCSIPortList		scsiportlist
SCSIPortReset		scsiportreset 1
SCSIPortResetOnStartup	enabled	set scsiportresetonstartup 1 disabled
SCSIPortSelTimeout	250ms	get scsiportseltimeout

Command	Default	Example
SCSIPortSyncTransfer	enabled	set scsiportsynctransfer 2 disabled
SCSIPortTermination	enabled	set scsiporttermination 1 enabled
SCSIPortWideTransfer	enabled	set scsiportwidetransfer 2 disabled
SCSITargetLUNs	8	set scsitargetluns 1 64
SCSITargets		scsitargets 1
SerialNumber		get serialnumber
SerialPortBaudRate	115200	set serialportbaudrate 19200
SerialPortEcho	enabled	get serialportecho
SNTP	enabled	get sntp
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28
TailEventLog		taileventlog
Temperature		get temperature
Time	00:00:00	set time 03:32:30
TimeZone	EST	set timezone pst
Username	root	set username Barbara
VerboseMode	enabled	set verbosemode disabled
VirtualDriveInfo		virtualdriveinfo
Voltage		get voltage
WrapEventLog	enabled	set wrapeventlog disabled
zModem		zmodem receive

CLI command explanations

Command Line Interface commands are listed alphabetically with explanations of what they are used for, their defaults and syntax.

CAUTION

Using CLI without contacting an ATTO technician is not recommended because changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

The ExpressNAV interface is the preferred method to manage the FastStream SC 5300. Refer to Interface options on page 27 for details

AutoMap

Automap automatically maps a subset of target devices visible to the firmware. All previous maps are deleted.

AutoMap <fp>

CAUTION

All RAID group setup information is lost therefore all data is lost. Back up your files before performing this command.

AutoResume

*Enables/disables the automatic continue feature for interrupted rebuild, erase and write pattern operations at startup. If **AutoResume** is enabled, all interrupted rebuild, erase and write pattern operations are continued at startup. Optional parameter GroupName specifies the RAID group whose **Restart** features to be set. If no GroupName is specified, all existing RAID groups are affected.*

Default: all disabled

set AutoResume [Rebuild | Erase | WritePattern | all] [enabled | disabled] <GroupName>

BlockDevClean

Removes any ATTO configuration data from the block device with the specified BlockDevID. BlockDevID is the index of a block device provided by the BlockDevScan CLI command.

BlockDevClean [BlockDevID]

BlockDevIdentify

Causes the I/O LED of the drive to illuminate for one minute if it is accessible through the FC port

CAUTION

The BlockDevIdentify command is intended for diagnostic purposes only. Executing this command may adversely impact the performance and throughput of the FastStream for the time that the LED is illuminated.

BlockDevIdentify <Groupname> [BlockDevID | MemberIdx]

BlockDevIDStop

Turns off the IO LED of a previously identified disk drive.

BlockDevIDStop

BlockDevScan

Lists all currently connected physical drives along with any potential RAID group association. Each block device listed is assigned a unique index at the time of the scan to identify drives for other CLI operations. The optional ***flush*** *parameter forces rediscovery of all block devices and forces all existing RAID groups offline until member block devices are discovered.*

BlockDevScan <flush>

BootFibreDelay

Regulates the delay (in seconds) which the unit waits after startup before enabling the Fibre Channel ports. The value ***0*** *constitutes no delay.*

set BootFibreDelay [0 | 15 | 30 | 45 | 60 | 75]
get BootFibreDelay

BridgeModel

Reports model information about the FastStream.

get BridgeModel

BridgeName

Specifies the eight-character name assigned to the FastStream used to identify individual FastStream units. It is not the World Wide Name. The string is alphanumeric, eight characters long,.

Default: ""
set BridgeName [value]
get BridgeName

ClearEventLog

Clears the contents of the event log. No new entries are recorded until ClearEventLog has completed.

ClearEventLog

Date

Regulates the current date for this unit. The date range is 01/01/2000 to 12/31/2099.

set Date [MM] / [DD] / [YYYY]
get Date

DefaultInterleave

Assigns or retrieves the system-default interleave size for new RAID groups, where the interleave size is expressed as the number of 512-byte blocks. If an interleave size is not explicitly specified when a RAID group is created, then the ***DefaultInterleave*** *value is used instead.*

CAUTION

Changing the default interleave size may degrade performance.

Default: 128
set DefaultInterleave [16 | 32 | 64 | 128 | 256]
get DefaultInterleave

DeleteAllMaps

Removes all mapped devices from the map table. Upon the subsequent POST, if no maps are present the default maps are loaded.

DeleteAllMaps

DHCPFixedDelay

Selects/displays the delay, in seconds, between DHCP client request intervals, from between 0 seconds to 255 seconds. ***0*** *time is typical.*

Default: 0 (no delay)
set DHCPFixedDelay [0 - 255]
get DHCPFixedDelay

DisplayEventLog (all other bridges/appliances)

Displays the event log.The event log may be filtered using the ***DisplayEventLogFilter*** *command. The optional parameter* ***n*** *is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use +, - or = to scroll through the log. Press* ***q*** *to exit the command.*

DisplayEventLog <n>

DisplayEventLogFilter

*Filters the display of data for specified subsystems and levels during **DisplayEventLog** mode. Valid event log subsystem entries are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level is displayed.*

Subsystem	Levels
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
NVRAM	ALL
iSCSI	
PERF	
SCSI	
NDMP	
FC	
ALL	

Default: all all all
set DisplayEventLogFilter [subsystem | all] [level | all] [all | none]
get DisplayEventLogFilter [subsystem | all] [level | all]

DriveTest

Starts or stops a drive test with the previously specified configuration and drive list. Drives which are being used by the test are not available for RAID configuration or RAID operations. Only one test can be run at a time.

DriveTest [Begin | Cancel]

DriveTestConfig

*Configures the next drive test to perform one of the following operations: The test is not started until the DriveTest **Begin** command is given.*

init: initialize, destructive, write-only
read: non-destructive, read-only
verify: destructive verify
init-verify: destructive write-read-verify

set DriveTestConfig [init | read | verify | init-verify]
get DriveTestConfig

DriveTestList

*Specifies drives to be run in the next drive test including drives which are not part of a RAID group and not Hot Spares. The **all** parameter automatically chooses eligible drives. The test is not started until the DriveTest **Begin** command is given.*

set DriveTestList [drive [BlockDevID] | all]
get DriveTestList

DriveTestStatus

*Displays the status of the currently running drive test but does not display performance metrics. If a block device ID is not running or cannot be found, its state is **idle** and percent complete is **0.***

get DriveTestStatus <drive [BlockDevID]>

DumpConfiguration

Displays a unit's configuration.

DumpConfiguration

DumpEventLog

Dumps the contents of the entire event log to the current CLI session without impact on the log itself (the log is not cleared). No events are recorded until the command has been completed.

DumpEventLog

EmailFromAddress

Configures the E-mail address that the FastStream uses to talk to the E-mail server. Full E-mail address is a fully qualified Internet E-mail address, not more than 128 characters.

set EmailFromAddress [full E-mail address]
get EmailFromAddress

EmailNotify

Regulates E-mail notification.

Default: disabled.
set EmailNotify [enabled | disabled]
Requires a SaveConfiguration command
get EmailNotify

EmailNotifyAddress

Configures notification addresses using an index (a number between 1 and 5, inclusive), the full E-mail address of the recipient, a fully qualified Internet E-mail address not more than 128 characters long, and a level.

Levels are
None: no E-mails sent.
Critical: critical event notification.
Warning: warnings and critical event notification.
All: all warnings, critical events

set EmailNotifyAddress [index] [full E-mail address] [warning level]
get EMailNotifyAddress <index | all >

EmailPassword

Configures the password used to authenticate the login to the SMTP E-mail server. The password must not be more than 64 characters. A password is not required if the E-mail server does not require authentication.

set EmailPassword [password]

EmailServerAddress

Configures the address of the server that the FastStream should contact in order to send E-mails.

Default: 0.0.0.0
set EmailServerAddress [IP address]
get EmailServerAddress

EmailUsername

Configures the user name used to authenticate the login to the SMTP E-mail server. The user name cannot exceed 128 characters. A user name is not required if the E-mail server does not require authentication.

set EmailUsername [user name]
get EmailUsername

EthernetMDIX

Specifies the Ethernet twisted-pair connection type.

*The **MDI** setting connects the unit's Ethernet port to an Ethernet hub or switch port with a standard Ethernet patch cable (or to a PCI card with a cross-over cable).*

*The **MDIX** setting connects the unit's Ethernet port to an Ethernet PCI card with a standard Ethernet patch cable (or to a hub or switch with a cross-over cable).*

*The **Auto** setting attempts to automatically determine the correct setting.*

Default: MDI
set EthernetMDIX [mp1] [MDI | MDIX | auto]
get EthernetMDIX [mp1]

EthernetSpeed

Sets/displays the current speed of the Ethernet connection.

Default: auto
set EthernetSpeed [mp1] [10 | 100 | Auto]
Requires a SaveConfiguration command
get EthernetSpeed [mp1]

EventLog

When enabled, records various system errors to the event log.

Default: enabled
set EventLog [enabled | disabled]
get EventLog

EventLogFilter

Filters data from specific unit subsystems and levels when event logging is enabled. The specific entries supported are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level is displayed.

Subsystem	Levels
ECC	INFO
ENET	WARN
GEN	CRIT
HTTP	FAIL
NVRAM	ALL
iSCSI	
PERF	
SCSI	
NDMP	
FC	
ALL	

Default: all all all
set EventLogFilter [subsys | all] [event level | all] [all |none]
get EventLogFilter [subsystem] [level]

Exit

Exits the current Ethernet telnet CLI session; it has no effect if used during a serial or in-band CLI session.

Exit

FCConnMode

*Controls/reports the connection mode the FastStream uses when communication across a FC network, either to a Fibre Channel arbitrated loop (FC-AL) when you select **loop** mode, or point-to-point when you choose **ptp**. If you choose **loop-ptp** or **ptp-loop**, the FastStream tries to use the first parameter first.*

Default: loop
set FCConnMode [fp | all] [loop | ptp | loop-ptp | ptp-loop]
Requires a SaveConfiguration command
get FCConnMode [fp | all]

FCDataRate

Specifies the rate the FastStream uses, 1 Gigabit/sec., 2 Gigabit/sec. 4 Gigabit/sec. or auto negotiate.

Default: auto
set FCDataRate [fp | all] [1Gb | 2Gb | 4Gb | auto]
Requires a SaveConfiguration command
get FCDataRate

FCHard

Used to enable or disable FC hard address assignment. Under soft addressing, the FastStream loop address is assigned during loop initialization.If you enable hard addressing use FCHardAddress (described below).

Default: disabled
set FCHard [enabled | disabled]
Requires a SaveConfiguration command
get FCHard

FCHardAddress

Sets/displays the value used as the FC-AL hard address. This hexadecimal value represents the address the FastStream tries to use if hard addressing is enabled.Refer to FCHard. When an address is not set, the current value is displayed. The valid range of values is 0 through 125.

Default fp1=3; fp2=4
set FCHard Address [fp | [address]]
Requires a SaveConfiguration command
get FCHardAddress [fp | all]

FCMultiNode

When enabled (multi node), each port reports a separate unique Node Name and logical units may be mapped to either port. When disabled (single node), each port reports the same Node Name and each logical unit mapping is applied to all ports. The command is the basis for a special configuration in the ExpressNAV interface Audio Setup Wizard. Refer to Audio on page 8.

set FCMultiNode [enabled | disabled]
get FCMultiNode

FCPortErrors

FCPortErrors displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or ResetFCPortErrors.

get FCPortErrors

FCPortFailover

Regulates the current operating mode of FC ports on the unit. When disabled, all Fibre Channel ports are active. When enabled, a designated Fibre Channel port is marked as reserved and becomes active only in the event of a port failure. In the case of such a failure, the failover port takes on the identity of the failed port. If this option is enabled, all device maps on the designated failover port are deleted.

set FCPortFailover [enabled | disabled]
get FCPortFailover

FCPortList

*Returns a list of available FC ports and their current status. Valid status values are **Up, Down, Failed, Reserved** and **Disabled.***

FCPortList

FCPortRecover

Controls the behavior of Fibre Channel ports while the unit is operating in port failover mode. The unit tries to restore the pre-failover state after a failover condition. Refer to FCPortFailover.

FCPortRecover

FCWWName

Reports the Word Wide Name (WWN) of the FC interface. Each FC port has an individual and unique WWN. The least significant 3 bytes of the WWN are used as the Ethernet MAC address. The lower nibble of the highest byte designates the port number.

get FCWWN [fp | all]

FirmwareRestart

*Resets and reinitializes the unit firmware. Use the **forced** option to override any CLI reservations held by other sessions.*

FirmwareRestart <forced>

Help

Displays a list of available commands. If command name is specified, displays detailed command-specific information.

Help <command name>

HSAdd

Assigns a Block Device to the Hot Spare pool.

HSAdd [BlockDevID]

HSDisplay
Lists all devices in the Hot Spare pool.

HSDisplay

HSRemove
Removes a Block Device from the Hot Spare pool

HSRemove [BlockDevID]

IdentifyBridge
Enabling this option causes the front panel Ready LED of the FastStream to blink until the parameter is disabled.

Default: disabled
set IdentifyBridge [enabled | disabled]
get IdentifyBridge

Info
Displays version numbers and other production information for key components.

Info

IPAddress
Regulates the current FastStream IP address.If IPDHCP is enabled (see below), get command reports current IP address assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP Address, whether or not a SaveConfiguration is performed.

Default IP Address: 10.0.0.1
set IPAddress [mp1] xxx.xxx.xxx.xxx
get IPAddress [mp1]

IPDHCP
Selection allows the FastStream to request an IP address from the network. The network must have at least one DHCP server.

Default: enabled
set IPDHCP [mp1] [enabled | disabled]
Requires a SaveConfiguration command
get IPDHCP [mp1]

IPGateway
Controls the current default gateways used by any Ethernet port(s) on the unit. If IPDHCP is enabled, the 'get' command reports the current IP gateway assigned by the network DHCP server.

Default: 0.0.0.0
set IPGateway [mp1] [xxx.xxx.xxx.xxx]
get IPGateway [mp1]

IPSubnetMask
Sets/displays the current subnet mask. If IPDHCP is enabled (see above), get command reports current subnet mask assigned by DHCP server. Setting this value always modifies the internal NVRAM value of the IP subnet mask whether or not a SaveConfiguration is performed.

Default: 255.255.0.0
set IPSubnetMask xxx.xxx.xxx.xxx
get IPSubnetMask

IsReserved
Displays the reservation status of the current unit.

IsReserved

MaxOpTemp
Regulates the maximum operating temperature of this unit in degrees Celsius. Valid entries are between 55 and 70 degrees.

Default: 70
set MaxOpTemp [55 – 70]
get MaxOpTemp

Metrics
Controls the collection of standard data metrics within a product via the command parameters.

Metrics [Start | Stop | Display] [drive [BlockDevID] | all | running]

MinOpTemp
Regulates the minimum operating temperature of this unit in degrees Celsius. Valid entries are between 0 and 15 degrees.

Default: 0
set MinOpTemp [0 – 15]
get MinOpTemp

OpTempWarn
Regulates the number of degrees Celsius before a thermal control event precipitates a warning to the user. Valid entries are between 0 and 15 degrees.

Default: 0
set OpTempWarn [0 – 15]
get OpTempWarn

Partition

Sets the specified partition to the specified capacity in Gigabytes (GB), Megabytes (MB), or blocks. The specified capacity must be smaller than the specified partition's current capacity. A new partition is created to acquire the remainder of the original partition's space. VirtualDriveInfo displays characteristics and statistics for all the available virtual drives or any available virtual drive identified by its virtual drive ID.

Partition [GroupName] [PartIdx] [capacity] [GB | MB | blocks]

PartitionDisplay

Lists all the partitions available in the specified RAID group. The partitions are listed in order of contiguousness (as opposed to index order). GroupName is the ASCII name of the RAID group for which partitions are displayed.

PartitionDisplay [GroupName]

PartitionMerge

Combines the specified contiguous partitions into one partition. GroupName is the ASCII name of the RAID group containing the partitions to merge. PartIdx is the index of a partition to merge, along with a number of contiguous partitions to merge to that index. 'All' indicates that all partitions in the RAID group are merged into a single Virtual Disk. The RAID group must not be in a NEW state. None of the partitions to merge may be mapped.

PartitionMerge [GroupName] [[[PartIdx] [2-128]] | All]

PartitionSplit

Divides the specified partition into one or more partitions whose capacities are evenly distributed among the capacity of the original partition. GroupName is the ASCII name of the RAID group containing the partition to split. PartIdx is the index of the partition to split. The partition to split cannot be mapped. The RAID group must not be in a NEW state.

PartitionSplit [GroupName] [PartIdx] [1-128]

Password

Specifies password for all non-serial sessions: Telnet, ftp and FastStream browser-based user interface. You are prompted for the current password, to type the new password, and to confirm the new password. If local ***echo*** *is enabled, password echoes all * characters. In verbose mode only, CLI requests the password be re-typed. When the password is all* ***0****s, Telnet and ftp do not validate the password and MD5 authentication is disabled. Passwords are case sensitive and can be 1-32 characters long with no spaces. Refer to* *Change current user name, password on page 15.*

Default: Password
set Password
Requires a SaveConfiguration command

Performance

Returns the performance data for the FC port you specify. Data includes the average rate (MB per sec.) and number of I/Os measured over the previous sampling period where a sampling period is approximately one second. Successful Read (08h, 28h) and Write (Oah, 2Ah) commands are considered I/Os.Reported performance may be affected by FC port availability and saturation and overall system use.

get Performance <fp>

Ping

Sends an ICMP echo request to the specified host.

ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>

RAIDCommandTimeout

Specifies in milliseconds the range of time the drives have to respond. If you set this value too low, failures may occur during normal operation.

Default: 30000
set RAIDCommandTimeout [100 - 3600000]
get RAIDCommandTimeout

RAIDRebuildPriority

*Sets or displays the RAID rebuild priority. A RAID rebuild priority set to **high** gives higher priority to RAID rebuilds and lower priority to the processing of simultaneous I/O transactions. A RAID rebuild priority set to **low** gives lower priority to the rebuild and a higher priority to I/O transactions. Set **same,** the RAID rebuild and processing of I/O transactions is the same.*

Default: same
set RAIDRebuildPriority [high | low | same]
get RAIDRebuildPriority

Reserve

Reports the state of CLI reservation for the current CLI session. If the command reports that Reservations are enabled, then another CLI session has control of parameter modification on the unit.

Reserve

ResetFCPortErrors

Resets all Fibre Channel error counts for the specified port to zero. See FCPortErrors

ResetFCPortErrors [fp | all]

RestoreConfiguration

*Issued with the **default** option, forces the unit NVRAM settings to their original defaults. The **saved** option undoes any changes made to this session since the last save.*

RestoreConfiguration [Default | Saved]

RGAddStorage

*Adds additional storage to an existing RAID group. **Mirror**|**Stripe**|**Span** specifies the method used to expand the storage. Optional parameter BlockDeviceID specifies available block device(s) to be added to the RAID group. Optional parameter **commit** specifies that the RGCommitcommand is run automatically.*

Note

Mirrors cannot be added to a RAID 5 group.

RGAddStorage [GroupName] [Mirror | Stripe | Span]
<BlockDeviceID> <commit>

RGCancelAddStorage

Cancels the RGAddStorage command.

RGCancelAddStorage [GroupName]

RGCommit

*Stamps a NEW RAID group's configuration to its member drives. After this command, a RAID group can be considered operational and transitions from the NEW state to the **Online, Degraded**, or **Offline** state depending on the health of the selected member drives. **RGCommit** also stamps an EXISTING RAID group's configuration to its member drives, when the EXISTING RAID group is in the process of having storage added. If the **init** option is specified, previous user configuration information is erased from each member drive.*

RGCommit [GroupName | all] [init]

RGCreate

Creates a NEW empty RAID group. The optional value after the RAID group type parameter represents the desired interleave for the RAID group, where the interleave size is expressed as the number of 512-byte blocks. If this value is not provided then the system-default interleave size is used (refer to DefaultInterleave).

RGCreate [GroupName] [RAID [0 | 1 | 10 | 5] | JBOD]
<16 | 32 | 64 | 128 | 256 >

RGDelete

*Deletes the specified RAID group. If **All** is used, the command deletes all existing RAID groups that do not have mapped Virtual drives. Any commands outstanding to the RAID group when this command is issued are completed before deleting the RAID group. A successful delete clears the configuration area of the member drives. This command fails if the specified RAID group does not exist. You are asked to confirm the delete if you have enabled VerboseMode.*

RGDelete [GroupName | All]

RGDisplay

*Displays status information for a single RAID group, or if **All** is used, all available RAID groups.*

RGDisplay [GroupName | All]

RGErase

Erases the data from the specified existing RAID group.

CAUTION

All data is lost if you use the RGErase command.

RGErase [GroupName]

RGHaltConversion
Stops the conversion on the specified existing RAID group.
RGHaltConversion [GroupName]

RGHaltErase
Stops the erase on the specified existing RAID group.
RGHaltErase [GroupName]

RGHaltRebuild
Stops the rebuild(s) on the specified existing RAID group. MemberIndex specifies the RAID member whose rebuild is stopped. If no MemberIndex is specified, all rebuilds on that RAID group are stopped.
RGHaltRebuild [GroupName] <MemberIndex>

RGHaltWritePattern
Stops the write pattern on the specified existing RAID group.
RGHaltWritePattern [GroupName]

RGMemberAdd
Adds an available block device to a NEW RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the NEW state, or if the specified block device index does not represent an available device. The RAID group cannot have been saved using the RGCommit command.
RGMemberAdd [GroupName] [BlockDevID]

RGMemberRemove
Removes a RAID member from a NEW RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the NEW state, or if the specified block device index does not represent an available device. The RAID group cannot have been saved using the RGCommitcommand.
RGMemberRemove [GroupName] [BlockDevID]

RGRebuild
Starts rebuilding the specified existing RAID group. Optional parameter MemberIndex specifies the member to rebuild. If no member is specified, all degraded members are rebuilt. Optional parameter BlockDeviceID allows an available block device to be substituted for the RAID Member currently assigned to the MemberIndex.
RGRebuild [GroupName] <MemberIndex>
<BlockDeviceID>

RGResumeConversion
Continues the stopped conversion on the specified existing RAID group.
RGResumeConversion [GroupName]

RGResumeErase
Continues the erase on the specified existing RAID group.
RGResumeErase [GroupName]

RGResumeRebuild
Continues the rebuild(s) on the specified existing RAID group. MemberIndex specifies the RAID member whose stopped rebuild is continued. If no MemberIndex is specified, all stopped rebuilds on that RAID group are continued.
RGResumeRebuild [GroupName] <MemberIndex>

RGResumeWritePattern
Continues the write pattern on the specified existing RAID group.
RGResumeWritePattern [GroupName]

RGSpanDepth
Sets the span depth on the specified existing RAID group. The RAID group must be RAID Level 0, RAID Level 1, RAID Level 5, or RAID Level 10.
Default: 1
set RGSpanDepth [GroupName] [SpanDepth [1-32]]
get RGSpanDepth [GroupName]

RGSpeedRead
*Performs look-ahead during reads from RAID group member disks for **ALL** or the specified RAID group. This command fails if the RAID group does not exist. GroupName is the ASCII name of the RAID group for which look-ahead reads are performed.*
Default: disabled
set RGSpeedRead [GroupName | all] [enabled | disabled]
get RGSpeedRead [GroupName | all]

RGUnmap
Removes all mapped partitions for a RAID group from the routing table. The partitions themselves are unaffected but they are inaccessible to initiators. This command fails if the RAID group does not exist, or if it does not have any mapped partitions.
RGUnmap [GroupName | all]

RGWaitTimeout

*Specifies the maximum time in seconds that the system waits to discover previously-configured RAID groups attached to the drive. The timeout is used during system boot time and when the **BlockDevScan** command is issued.*

Default: 5
set RGWaitTimeout [1-3600]
get RGWaitTimeout

RGWritePattern

Writes a DWORD pattern of four hexadecimal bytes to the entire specified existing RAID group.

CAUTION

If the RGWritePattern command is used, the RAID group is set to offline and all data is lost.

RGWritePattern [GroupName] [Pattern]

RMState

Sets the member state on the specified existing RAID group member(s). RAID group may not be in the NEW state. Optional parameter MemberIndex specifies the RAID Member whose status is to be set. If no MemberIndex is specified, the status of all members of the specified RAID group is set.

Note

Members undergoing rebuild are not changed. Rebuilds on these members must first be stopped.

set RMState [GroupName] <MemberIndex> [Online | Degraded | Unavailable | Faulted]

RMStatus

Displays the status of all RAID Members within the specified RAID group or a specific RAID member (if specified) within the specified RAID group. The command fails if the specified RAID group does not exist or a specified member index within the RAID group does not exist.

RMStatus [GroupName] <MemberIndex>

Route

*Assigns a LUN protocol address to a target. Use the **Delete** identifier to remove the map. In verbose mode, overwriting a map requires secondary confirmation of the action.*

FCMultiNode disabled: Route FC [fl] [RAID [GroupName] [Partidx]] | Bridge | Delete]
FCMultiNode enabled: Route FC [fp] [fl] [RAID [GroupName] [Partidx]] | Bridge | Delete]

RouteDisplay

Displays a list of Fibre Channel to address mappings on the FastStream.

FCMultiNode disabled: RouteDisplay FC <fl>
FCMultiNode enabled: RouteDisplay FC <fp> <fl>

SaveConfiguration

*Issued with the restart option, cycles unit power after saving configuration changes. The **norestart** option saves changes without restarting.*

Note

Certain modifications require a system restart.

SaveConfiguration <Restart | NoRestart>

SCSIDomainValidation

Runs Domain Validation tests on the SCSI system which may detect problems with SCSI cables, termination or damaged transceivers. Tape drives attached to the FastStream should be loaded with media. The media is not overwritten. Disable VirtualDriveInfo before running this test and reboot the FastStream after running the test.

SCSIDomainValidation

SCSIInitID

Specifies the persistent SCSI Initiator ID used by the unit on this SCSI bus. All maps coinciding with the user-specified SCSIInitID are destroyed after this command is issued.

set SCSIInitID [sb] [0-15]
get SCSIInitID [sb]

SCSIPortBusSpeed

Controls the transfer rate at which the unit attempts to negotiate with its SCSI devices.

set SCSIPortBusSpeed [sb] [fast | ultra | ultra2 | ultra3] | ultra160 | ultra320]
get SCSIPortBusSpeed [sb]

SCSIPortList

Lists the status of all available SCSI ports.

SCSIPortList

SCSIPortReset

Resets the specified SCSI bus.

SCSIPortReset [sb]

SCSIPortResetOnStartup

Controls whether the specified SCSI bus is reset each time the unit is powered up.

set SCSIPortResetOnStartup [sb] [enabled | disabled]
get SCSIPortResetOnStartup [sb]

SCSIPortSelTimeout

Controls the time in milliseconds that the unit waits for a response from a device on the specified SCSI port after a selection request.

CAUTION

If you set this value too low, failures may occur during normal operation.

Default: 250
set SCSIPortSelTimeout [sb] [250 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1]
get SCSIPortSelTimeout [sb]

SCSIPortSyncTransfer

Controls the unit's attempts to negotiate synchronous SCSI transfers with devices on the specified bus.

Default: enabled
set SCSIPortSyncTransfer [sb] [enabled | disabled]
get SCSIPortSyncTransfer [sb]

SCSIPortTermination

Configures the SCSI internal termination of the specified SCSI port. Enabling termination allows the unit to act as a terminator at the end of a SCSI chain.

Default: enabled
set SCSIPortTermination [sb] [enabled | disabled]
get SCSIPortTermination [sb]

SCSIPortWideTransfer

Controls the unit's attempts to negotiate wide SCSI transfers with devices on the specified bus.

Default: enabled
set SCSIPortWideTransfer [sb] [enabled | disabled]
get SCSIPortWideTransfer [sb]

SCSITargetLUNs

Controls the maximum number of SCSI LUNs per target the unit queries during a SCSI bus scan.

set SCSITargetLUNs [sb] [8 | 64]
get SCSITargetLUNs [sb]

SCSITargets

Lists the physical devices that are connected and running on the specified SCSI port.

SCSITargets [sb]

SerialNumber

Reports the FastStream serial number which is unique for each FastStream. The serial number tracks the board throughout its life and should not be changed.

get SerialNumber

SerialPortBaudRate

*Configures the baud rate for the unit's RS-232 serial port. The number of data bits is fixed at **8** with no parity.*

Default:
set SerialPortBaudRate [9600 | 19200 | 38400 | 57600 | 115200]
get SerialPortBaudRate

SerialPortEcho

Controls if the unit echoes characters on its RS-232 port. When enabled, all non-control character keyboard input is output to the display.

Default: enabled
set SerialPortEcho [enabled | disabled]
get SerialPortEcho

SNTP

Controls whether SNTP time server is used.

Default: enabled
set SNTP [enabled | disabled]
get SNTP

SNTPServer

Controls or displays the main IP address the client uses to retrieve the SNTP time.

Default: 192.43.244.18
set SNTPServer[xxx.xxx.xxx.xxx]
get SNTPServer

TailEventLog
*Displays new events to the terminal. Type **q** and press **Enter** to exit tail mode.*

TailEventLog

Temperature
Displays the current internal operating temperature of this unit in degrees Celsius.

get Temperature

Time
Controls or displays the current time as clocked by the unit in 24 hour format. Time cannot be set while SNTP is enabled.

set Time [HH: MM: SS]
get Time

TimeZone
Controls or displays the time zone or an offset from GMT for the unit.

Default: EST
set TimeZone [[EST | CST | MST | PST] | [+/-HH:MM]]
get TimeZone

UserName
Specifies the user name used for all sessions: NDMP, Telnet, FTP and ExpressNAV. user name is case insensitive, 1 to 32 characters, and cannot contain spaces. It is best practice to change the user name and password from the default values. Refer to Change current user name, password on page 15.

Default: root
set UserName [user name]
get UserName

VerboseMode
Controls the level of detail in CLI Help output and command response output for the current CLI session.

Default: enabled
set VerboseMode [enabled | disabled]
get VerboseMode

VirtualDriveInfo
Displays characteristics and statistics for all the available virtual drives or any available virtual drive identified by its virtual drive ID.

VirtualDriveInfo

Voltage
Displays the voltage levels monitored by the FastStream.

Representations of the voltages are
- VDDA: +3.31 V
- VDDB: +2.49 V
- VDDC: +1.5V
- VDDD: +1.35V
- ALL: all monitored voltages

get Voltage [VDDA |VDDB |VDDC VDDD | all]

WrapEventLog
When enabled, the FastStream logs up to 2,048 event entries before wrapping (overwriting the first entries). If disabled, the FastStream stops logging event entries when the buffer is full.

Default: enabled
set WrapEventLog [enabled | disabled]
get WrapEventLog

zModem
*Uses the zMODEM protocol to transfer a file to or from the unit via the RS-232 port. The filename to retrieve is required if the **send** option is specified.*

Zmodem [send [filename] | receive]

Appendix D Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. If this equipment is not used in strict accordance with the manufacturer's instruction, it can cause interference with radio and television reception. See the ATTO FastStream SC 5300 Technical Specification sheet for your particular model for a full list of certifications for that model.

FCC Standards: Radio and Television Interference

WARNING

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to the FCC rules Title 47 of the CFR, Part 15, Subpart B which are designed to provide a reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, try to correct the interference by one or more of the following measures:

- Move the receiving antenna.
- Relocate the FastStream SC 5300 with respect to the receiver, or move the FastStream SC 5300 away from the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.
- If necessary, consult an ATTO authorized dealer, ATTO Technical Support Staff, or an experienced radio/television technician for additional suggestions.

The booklet *How to Identify and Resolve Radio/TV Interference Problems* prepared by the Federal Communications Commission is a helpful guide. It is available from the US Government printing office, Washington, DC 20402, Stock No. 004-000-00345-4.

Further results of FCC Testing

In certain instances, extraordinary variances in the AC power supplied to this unit will require the operating system's normal error recovery procedure to retry the current command. In this case, the unit can fully recover with no loss of data, and without user intervention. Note that other exceptional conditions in addition to variances in the AC power, such as improper cabling or unrecognized commands, may also trigger these normal error recovery procedures.

MET

Listed with MET UL 60950-1/CSA C22.2 No. 60950.

Canadian Standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Standards

Declaration of Conformity

This following statement applies to the ATTO FastStream SC 5300.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards:

Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55022, (CISPR 22) / EN55024 (CISPR24) / IEC EN 60950-1

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.

The ATTO FastStream SC 5300 complies with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Appendix E Warranty, contact information

Manufacturer limited warranty

Manufacturer warrants to the original purchaser of this product that it is free from defects in material and workmanship as described in the ATTO Technology website, **www.attotech.com**. Manufacturer liability shall be limited to replacing or repairing, at its option, any defective product. There is no charge for parts or labor should Manufacturer determine that this product is defective.

Products which have been subject to abuse, misuse, alteration, neglected, or have been serviced, repaired or installed by unauthorized personnel shall not be covered under this warranty provision. Damage resulting from incorrect connection or an inappropriate application of this product shall not be the responsibility of Manufacturer. Manufacturer's liability is limited to Manufacturer's product(s); damage to other equipment connected to Manufacturer's product(s) is the customer's responsibility.

This warranty is made in lieu of any other warranty, express or implied. Manufacturer disclaims any implied warranties of merchantability or fitness for a particular purpose. Manufacturer's responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. Manufacturer is not liable for any indirect, special, incidental, or consequential damages irrespective of whether Manufacturer has advance notice of the possibility of such damages. No Manufacturer dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

Contact ATTO Technology, Inc.

Customer service, sales and technical support are available by phone Monday through Friday, 8 a.m. to 5 p.m EST., or by fax and website 24-hours a day.

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